

LACUS FORUM XXX

*Language, Thought
and Reality*



University
of Victoria

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Edited by

**Gordon D. Fulton,
William J. Sullivan &
Arle R. Lommel**



THE LINGUISTIC ASSOCIATION OF CANADA AND THE UNITED STATES

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FIRST EDITION

Published by LACUS, the Linguistic Association of Canada and the United States, in Houston, Texas, USA. Current address and contact information for LACUS can be found on the World Wide Web at <http://www.lacus.org>.

Manufactured in the United States.

ISSN 0195-377X

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Gordon Fulton, William J. Sullivan & Arle R. Lommel





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PREFACE

IN MEMORIAM: CARL MILLS, INDEFATIGABLE LACUS CONTRIBUTOR, LOYAL FRIEND

The thirtieth LACUS Forum was held July 29 to August 2, 2003 at the University of Victoria in Victoria, British Columbia. The conference theme was *Language, Thought and Reality*, intentionally invoking the important line of work inspired by Benjamin Lee Whorf and Edward Sapir. Contributions were invited on any aspect of the theme. And, in keeping with LACUS tradition, papers were welcomed on any aspect of general and interdisciplinary linguistics, including contributions representing or proposing innovative ideas or unpopular views.

The University of Victoria campus was both pleasant and hospitable, offering excellent facilities for the meeting, coordinated and arranged by Gordon Fulton, local host and one of the editors of this volume. The environment in the beautiful city of Victoria at the southern end of Vancouver Island was a superb setting for extracurricular activity and for vacationing before or after the meeting.

Major presentations were offered by Penny Lee of the University of Western Australia (a leading authority on the work of Benjamin Lee Whorf), Gary Libben of the University of Alberta and Keren Rice of the University of Toronto. Angela Della Volpe gave the presidential address, an exceptionally erudite presentation entitled 'On Gothic *Gahlaiba* and Latin *Companion*: An Excursus in Historical Linguistics Methodology'.

Continuing a tradition started by the late Kenneth Pike to provide encouragement to younger scholars, a committee consisting of the President, the President-Elect, and former Presidents of LACUS selected the winner of the annual Presidents' Prize, with an award of \$500, for the best paper by a junior scholar. The prize for 2003 was won by Patricia 'Casey' Sutcliffe for her paper 'Max Müller's Refutation of Darwin: A Missing Link in the Descent of Linguistic Relativity from Humboldt to Whorf', which is presented on page 59. The Presidents' Predoctoral prize, with an award of \$100, for the best paper by a student who has not yet received a doctoral degree, was awarded to Laura Matzen (who had just graduated from Rice University), for her paper 'Discourse Markers and Prosody: A Case Study of *So*'. For purposes of these prizes, 'best paper' is defined as that paper which, in the judgment of the committee, makes the most important contribution to knowledge. Organization and presentation and the quality of the abstract were also considered. The prizes were awarded at the annual banquet.

As in past years' volumes, the papers in this volume continue LACUS' tradition of diversity and openness to new ideas. LACUS has no dominant ideology or theory, and the papers presented at the conference range from neurolinguistics to computational linguistics, comparative studies, language acquisition, the history of linguistics, and linguistic philosophy. The language index presented at the end of this volume

shows that LACUS authors have a strong comparative streak; it includes over eighty languages cited or studied in the papers in this volume.

The papers included in this volume have gone through a two-step review process: First, the screening of abstracts submitted; second, the screening of papers. Referees for the first stage were members of the LACUS Board of Directors and members of the Program Committee. Reviewers for the second stage were the members of the Publications Committee. At both stages, continuing the LACUS tradition, reviewers not only recommended acceptance or rejection; more important, they offered extensive help, where needed, to authors whose abstracts or papers were seen to offer possibilities for improvement. In addition, many of the papers were revised after the meeting before being submitted for publication, and authors were encouraged to take into account the often lively discussion following the presentations that is typical at LACUS meetings.

The three co-editors employed a preplanned division of labor, according to which Gordon Fulton was in charge of the process of evaluation of papers by the reviewers, William J. Sullivan performed the task of copy-editing, and Arle Lommel took charge of production of final editing and production of the electronic files used to produce the volume. We thank the members of the publications committee for their conscientious work of evaluating the submissions and recommending improvements to authors.

We would like to offer special thanks to David Bennett for his skillful and careful work in organizing the program, and to Lois Stanford for her editorial assistance. Thanks also to Shin Ja Hwang, Chair of the Publications Committee, for her assistance in organizing this volume. And finally, thank you to all of the authors whose papers appear in this volume.

September 2004.

- Gordon D. Fulton
- William J. Sullivan
- Arle R. Lommel

I



FEATURED
LECTURES





PRESIDENTIAL ADDRESS



ON GOTHIC GAHLAIBA AND LATIN COMPANION:
AN EXCURSUS IN HISTORICAL LINGUISTICS METHODOLOGY

Angela Della Volpe
California State University, Fullerton

The following was conceived in appreciation and homage to my friends and colleagues at LACUS who warmly befriended me, sixteen years ago, when I first joined the Linguistic Association of Canada and the United States. Through the years, I have benefited in large measure from their intellectual companionship and support. I, therefore, found it apt as an historical linguist to re-examine the etymology of the Late Latin term *companion*.

THIS PAPER REPRESENTS AN EXCURSUS in Comparative Historical Linguistics methodology. It endeavors to explore what we do, when we try to ascertain the most probable etymology of a word; how we do it; and what, if anything, do we get out of it. Accordingly, while not intending to introduce a new and definite solution to an etymological problem—though in the end the data may point towards some resolution—this essay, by the use of a case study, will strive to illustrate the formalization process that has ensued from advances made in the area of borrowing by the Historical and Comparative method, during the twentieth century.

To introduce the problem, classic scholarship provides a rather unsolvable puzzle when it comes to the etymological analysis of the word *companion*. Among scholars, half assume that the Latin term is actually a semantic loan derived from Goth. *gahlaiba* while the other half assume the reverse, suggesting that the direction of the *calque* is, in fact, from Vulgar Latin into Gothic. Linguistically, both *companion* and *gahlaiba* could fit the definition of loan translation. And in fact, the historical situation in Western Europe during the earliest centuries of the first millennium AD (Heather 1969) was conducive to large numbers of loans or borrowings¹ both from Germanic into Late Latin and from Late Latin into Germanic. In such cases, the Comparative Historical method, whose preliminary aim is to ferret out loanwords from legitimate cognates, offers some guidance.

In general, it is possible to get an idea of the direction of a borrowing by determining whether the phonological patterns of the presupposed borrowing language have been violated—a word like *Mbakara*² for instance, violates English phonotactic constraints and is accordingly marked as a loanword in English. Hence, the analysis of phonological constraints, concurrently with the investigation of the historical phonology of both the donor and the recipient languages, affords an extremely valuable tool in discovering the direction of a borrowing. A second criterion used in this area

relies on the determination of the morphological complexity of the word under investigation. The language which shows a more complex morphology is usually marked as the source of the borrowing. A commonly cited example is the English word *vinegar* which was borrowed from French *vinaigre*, compound of *vin* 'wine' + *aigre* 'sour'. Lastly, the donor language is assumed to be the one with the most cognates (L. Campbell 1999:64–69). Along with such investigative linguistic devices, scholars avail themselves of additional evidence such as those preserved in the historical and cultural records.

Thus, taking into account the above listed criteria for its theoretical framework while also considering the historical and cultural contexts, this essay will investigate the etymology of the term *companion*. This exploration will be divided into three parts. The first part will survey the origin of the Gothic term *gahlaiba* whereas the second will look at the origin of VL **companion*. The third and final part will offer some suggestions in light of the historical-cultural context and historical linguistic methodology.

1. THE SCHOLARSHIP OF GOTHIC *GAHLAIBA*. The sole evidence presented by those scholars who maintain the view of an original Gothic coining borrowed into Latin is that the first attestation of the Gothic compound *gahlaiba*, literally 'co-breader', comes from the Gothic Bible which is ascribed to Wulfila or Ulphilas (b. 311 d. 380 or 381)³ and dates from the 4th century AD. Feist (1939:183) states that *gahlaiba* derives from an unattested **gahlaifs*, and gives its meaning as '*der das Brot mit jemandem gemainsam hat*', in other words, 'he who has bread in common with someone'. Feist then adds that this is a loanword from VL **cumpanio* from Lat. *pānis* 'bread', OF. *compain*, Fr. *compagnon* but that it is possible that the Latin term is a calque fashioned after the Germanic compound and cites Meyer-Lübke (1935:2093) in support.

Lehmann (1986:139) reports that while Velten (1930:345) also regards Goth. *ga-hlaiba*, OHG *ga-leipo*, as a calque from the Vulgar Latin military term **companion*, on the other hand, Meillet (1966:266–78), Scardigli (1964:188–89, 283–84), and Meyer-Lübke (1935:2093) among others, prefer to assume that the Vulgar Latin term was based on Goth. *gahlaiba*. Indeed, Meillet (1966:277–78) states that 'la formation de *companion* calque celle de got. *gahaiba* "qui partage le pain avec": il y a là un terme militaire, venant de pratiques militaires.' He also points out that 'la notion de *companion* se retrouve dans le nom arménien *ənker* "compagnon", littéralement "qui mange avec."

Scardigli (1964:188–220) concedes that there are many calques from Greek and Latin into Gothic and reasons that many of the semantic translations created by Wulfila suggest both bilingualism and biculturalism among the Goths. Were it otherwise, the referents of those calques would not have been readily understood by his intended audience. Scardigli further notes that, among the attestations of *gahlaiba*, there are some inconsistencies. For instance, in the Naples document, we find both *gahlaibim*, which is a theme in *-i-*, and *gahlaibaim*, which suggests a strong adjective with a theme in *-a-*. Both of these terms, however, should belong to the declension

in *-n-* as compounds with *ga-* generally do. Scardigli believes that Wulfila probably created the term, and that the Goths took it with them into Italy (Scardigli 1964:220).

Meyer-Lübke (1935:2093) flatly affirms, under a reconstructed **companion -ōne* ‘Genosse’, that the Latin term is a formation patterned after Germanic *gahlaiba* and gives its cognates in Romance languages; thus Italian *compagno*, Old French *compain*, *compagnon*, Provençal *companh*, *companhó*, Catalan *company*, *companyó*, Spanish *compañó*. Meyer-Lübke lists as derivatives It. *compagnia*, Fr. *compagnie*, Prov. *companhia*, Sp. *compañia*, Port. *companhia* ‘Gesellschaft’. Moreover, in the entry preceding that of *companion*, 2092a, he provides another postulated form: **companicum* ‘Naturalverpflegung’ (provisions) which supposedly gives Salamanca *compango*. In fact, the term *compango* in Asturian refers to a meat dish accompanied by beans and not by bread (Ferreiro, Manzano, Rodríguez 1995: 130).

Lastly, in a two-part study on Gothic borrowings, Velten (1930:335) finds that there are about 400 calques or loan translations⁴, in Gothic, modeled after Greek and Latin compounds compared to a mere 116 loanwords from these two languages (Velten 1930:332). Among these semantic loans, Velten lists the term *gahlaiba* which calques Gr. *συστρατιώτης* and Lat. *commilito*: ‘*gahlaiba* = Vulgar Latin **cumpanio*, French *compagnon* “one who eats from the same loaf” from *panis*’ (Velten 1930:35). Velten then suggests that *gahlaiba* renders a military term that belonged to the colloquial speech of the Roman legions with which the Goths were well acquainted in Wulfila’s time (Velten 1930:36).

In summary, a more in depth review of the scholarship still leaves us at an impasse in so far as either term could be a calque of the other and no evidence has been adduced to resolve the issue.

2. GOTHIC ATTESTATION OF THE TERM *GAHLAIBA*. As loan translations and semantic loans are notoriously difficult to recognize as such, and because the available scholarship has thus far not been very revealing of the origins of the aforementioned terms, following the investigative process of historical linguistics methodology, we will begin anew by analyzing the earliest attestations of the Gothic term. Perhaps this approach will help us solve the conundrum before us. The Gothic attestations of the term *gahlaiba* are as follows:

(1) John 11:16:

Goth. þanuh qaþ þomas saei haitada Didimus þaim ***gahlaibam*** seinaim:
gaggam jah weis, ei gaswiltaima miþ imma⁵. [CA]⁶

Eng. Then said Thomas, which is called Didymus, to his **companions** (disciples), “Let us go and die with him.”

Lat. dixit ergo Thomas qui dicitur Didymus ad **condiscipulos** eamus et nos ut moriamur cum eo⁷.

Greek εἶπεν οὖν Θωμᾶς ὁ λεγόμενος Δίδυμος τοῖς **συνμαθηταῖς**, Ἄγωμεν καὶ ἡμεῖς ἵνα ἀποθάνωμεν μετ’ αὐτοῦ⁸.

(2) Philippians 2:25

Goth. aþþan þarb munda, Aipafradeitu broþar jah gawaurstwan jah **gahlaiban** meinana, iþ izw<ar>ana apaustulu jah andbaht þaurftais meinaizos sandjan du izwis; [B]

Eng. But I think it necessary to send Epaphroditus, my brother and co-worker and **companion** (fellow soldier), but your apostle and minister to my need, to you.

Lat. necessarium autem existimavi Epafroditum fratrem et cooperatorem et **commilitonem** meum vestrum autem apostolum et ministrum necessitatis meae mittere ad vos.

Greek Ἀναγκαῖον δὲ ἡγησάμην Ἐπαφρόδιτον τὸν ἀδελφὸν καὶ συνεργὸν καὶ **συστρατιώτην** μου, ὑμῶν δὲ ἀπόστολον καὶ λειτουργὸν τῆς χρείας μου, πέμψαι πρὸς ὑμᾶς

Our investigation reveals that *gahlaiba* appears as a substantivized adjectival form both in *John* 11:16, where we have the dat. pl. m. form *gahlaibam*, and in *Philippians* 2:25 where we have the acc. sing. m. form *gahlaiban*. In the Naples Deed, a document so called because housed at the Biblioteca Nazionale in Naples, this contract, written on papyrus circa 551 AD during the Ostrogothic Empire, and originated by the clerics of the Gothic Arian church of Santa Anastasia in Ravenna, shows four signatures affixed at the bottom of the document. These signatures are meant to attest to a transaction between the church and a certain Peter Defensor. Within the signatures, there are four forms of Goth. *gahlaiba* in the dat. pl. m.; three written *gahlaibaim* and one written *gahlaibim*. The latter could be a scribal error rather than a theme in *-i-* (Scardigli 1964:187). Worthy of note is that the Clerics of Santa Anastasia in Ravenna are the ones who produced the Codex Argenteus (Heather 1996: 315). Thus:

- (3) Ik Ufitahari papa ufm<el>ida handau meinai jah andnenum skilliggans ·j· jah faurþis þairh kawtsjon miþ diakuna Alamoda unsaramma jah miþ **gahlaibaim** unsaraim andnenum skilliggans ·rk· wairþ þize saiwe.
- (4) Ik Sunjaifriþas diakon handau meinai ufmelida jah andnenum skilliggans ·j· jah faurþis þairh kawtsjon jah miþ diakona Alamoda unsaramma jah miþ **gahlaibaim** unsaraim andnenum skilliggans ·rk· wairþ þize saiwe.
- (5) Ik Merila bokareis handau meinai ufmelida jah andnenum skilliggans ·j· jah faurþis þairh kawtsjon jah miþ diakuna Alamoda unsaramma jah miþ **gahlaibim** unsaraim andnenum skilliggans ·r-k· wairþ þize saiwe.
- (6) Ik Wiljariþ bokareis handau meinai ufmelida jah andnenum skilligngans ·j· jah faurþis þairh kawtsjon jah miþ diakona Alamoda unsaramma jah miþ **gahlaibaim** unsaraim andnenum skilig<g>ans ·r-k· wairþ <þ>ize saiwe.

3. MORPHOLOGICAL ANALYSIS OF GA-HLAIBA. According to the available data, then, there seems to be one form with weak endings, as evidenced by the dat. pl. m. *gahlaibam*, which suggests the reconstruction of a nominative **gahlaiba*, and another

form with strong endings evidenced by *gahlaibaim* and which suggests the reconstruction of a nominative **gahlaifs*. The latter, however, does not conform to the *-n*-stem declension as expected in compounds with *ga-*. Finally, there is also a theme in *-i-* (Scardigli 1964:188). Though we are left to wonder about these alternations, both between themes and between weak and strong endings, from a word formation viewpoint, we can still identify *gahlaiba* as a bahuvrihi compound composed of a prefix *ga-* and possibly belonging to a declension in *-an* (Von Grienberger 1900:84). The prefix *ga-* was rather productive in this function and a number of such compounds exist in Gothic. Originally a preposition which had the meaning of ‘together’, ‘with’, already in primitive Germanic, it was no longer used as an independent preposition but as a prefix for coining collective nouns, or more often, as an intensive, for example, in *ga-baurþs*, ‘birth’, *ga-bruka* ‘fragment’, *ga-juk*, ‘a pair’ *ga-man* ‘fellow man’, *ga-waurstwa* ‘fellow worker’ (Wright 1968:172–73; Braune 1920:110–111). In compounds, this verbal and/or nominal prefix was characterized by a weak accent and exhibited not only the meaning of ‘with’ but also of ‘together with’ as in OE *ge-*, *gi-*, OFris *ge-*, *ie-*, *e-*, *i-*, OHG *ga-*, *gi-*⁹. Thus, a word like *ga-hlaiba* would have the meaning of ‘he who has bread with (others?)’. Gothic shows an abundance of bahuvrihi compounds. This type of word formation may exhibit, as the first member of its compound, either a noun, *aihva-tundi* ‘having horse-like teeth’; an adjective, *alja-kuns* ‘having other kin, stranger’; an adverb, *swa-leiks* ‘having such appearance’; a pronoun, *hvi-leiks* ‘having appearance like’; or as in our case, a prefix such as *ga-* ‘having X with’ or ‘having X in common’ (Dolcetti Corazza 1997).

Among the Gothic bahuvrihi compounds formed with the *ga-* prefix are the following: *ga-juka* < *juk* ‘yoke’, ‘having a yoke in common, mate’, found only in the accusative plural *ga-jukans* (2 Corinthians 6:14)—*ga-juko*, f. ‘Genossin’ (Philippians 4:3)—assumed to be a calque from Gr. *Παραβολή* (Velten 1930:339); *ga-sinþa* ‘having travel in common, companion’, dative plural *gasinþam* (2 Corinthians 8:19); *ga-sinþja* ‘traveling company’ most probably in the sense of roaming expedition; *ga-waurstwa* ‘having work in common, fellow worker’ (2 Corinthians 8:23)¹⁰; *ga-daila* < *dails*, ‘part’; ‘having a part in common, partner’; *ga-dauka*, < **dauks* ‘house’, ‘having a house in common, house mate’, *ga-leika* < *leik*, ‘form, body’, ‘having a form (countenance) in common’. These compounds seem to use the verb ‘to have’ as their verbal predicate and to be characterized by a nasal suffix in *-an*. Moreover, in these bahuvrihi compounds, the prefix *ga-* seems to denote parity in the possession of the quality or objects described (Ramat 1976:65–76).

4. THE SEMANTICS OF *GAHLAIBA*. Analyzing the semantics of *gahlaiba* reveals two problems. The first relates to the meaning of the prefix. The semantic rendition of *ga-* as ‘common’ and thus of translating *gahlaiba* as ‘having common bread’ has occupied several scholars. Among them is Giacalone Ramat (1976:65–76) who has analyzed the meaning of *ga-* in this particular compound and has concluded that therein, the prefix *ga-* retains the nuance *not* of ‘with’ or ‘together’, but of ‘common’. Yet, the interpretation of *gahlaiba* as ‘having common bread’ or even as ‘having bread in common’

raises the question of how. One can have a ‘common yoke,’ one can have a ‘common way,’ one can even have a ‘common form (countenance),’ but how does one have ‘common bread?’ Bread is consumed; it is not held or had in common. In which case, we must infer that, in this particular case, the prefix *ga-* may just have the meaning of ‘together or together with’ rather than denoting the meaning of ‘common.’ Unfortunately, there is little contextual evidence upon which to base the choice of one meaning over the other.

The second semantic problem arises with the notion of military obligation. Meillet, Velten and others (see above) assume that the meaning of companionship and of sharing bread in Goth. *gahlaiba* entails a military nuance. The evidence, however contradicts this inference. There were other terms in Gothic which Wulfila could have used to render the notion of brothers-in-arms. Two of them come readily to mind: *ga-drauhts* (Matthew 8:9; John 19:2; Luke 7:8; 2 Timothy 2:3) and *ga-sinþa* (2 Corinthians 8:19)¹¹, both of which occur elsewhere in the Gothic Bible:

- (7) 2 Timothy 2:3 [B] - *gadrauhts* ‘soldier’:
Goth. þu nu arbaidei swe gods *gadrauhts* Xristaus Iesus.
Eng. endure, therefore, hardship like a good *soldier* of Christ Jesus.
Lat. labora sicut bonus *miles* Christi Iesu.
Greek συγκακοπάθησον ὡς καλὸς στρατιώτης Χριστοῦ Ἰησοῦ.
- (8) 2 Corinthians 8:19 [B] – *gasinþa* ‘travelling companion’:
Goth. aþþan ni þat~ain, ak jah gatewiþs fram aikklesjom miþ *gasinþam*¹²
uns miþ anstai þizai andbahtidon fram uns du frauþins wulþau jah
gairnein unsarai.
Eng. and not only, but he was chosen by the churches to travel with us
with this grace which is administered by us to the glory of the Lord
himself and to show our eagerness to help.
Lat. non solum autem sed et ordinatus ab ecclesiis comes *peregrinationis*
nostrae in hac gratia quae ministratur a nobis ad Domini gloriam et
destinatam voluntatem nostrum.
Greek οὐ μόνον δέ, ἀλλὰ καὶ χειροτονηθεὶς ὑπὸ τῶν ἐκκλησιῶν
συνέκδημος ἡμῶν σὺν τῇ χάριτι ταύτῃ τῇ διακονουμένῃ ὑφ’ ἡμῶν
πρὸς τὴν αὐτοῦ τοῦ κυρίου δόξαν καὶ προθυμίαν ἡμῶν

5. DIGEST. Thus far, the only factor supporting the theory that *ga-hlaiba* was a semantic borrowing is the undisputed evidence that Wulfila was clearly fluent in both Greek and in Latin and that given the morphology of OF. *compain*, (Prov. *compain*) there may have been a Latin form *cum-panio* of which there is no attested evidence. Unquestionably, the Gothic translation of the New Testament shows many Grecisms in both morphology and syntax (Bennett 1980:127), although Latinisms are also evident, particularly with regards to the creation of bahuvrihi compounds. Some such examples are: Goth. *hardu-hairts*, which appears to be a calque from Gr. *σκληροκαρδία*; Goth. *arma-hairts*, which is clearly a calque of Lat. *miseri-cors*; Goth. *ga-daila*,

obviously from Lat. *con-particeps*; and according to Velten, Goth. *ga-hlaiba* from Lat. *com-pan-io*. (Velten 1930:339–45).

Once again, our excursus informs us that the scholarship has been unable to determine whether or not the term *gahlaiba* was an original Gothic coining. Analyzing the attestations of the term, both in the Bible and in the Naples Deed, does not shed any further light on the matter. Certainly, the quest for violations of phonotactic constraints or morphological complexity remains open notwithstanding the peculiarities of the Gothic compound, both on the morphological and semantic level. Consequently, availing ourselves of the last device mentioned in the introduction of this paper, in order to ascertain the direction of borrowing, we now look for cognates in related Germanic languages. The following terms can be found: OE *gædeling* (-as) m., ‘companion, comes’; *gefara* (-n) m., ‘companion, associate, *socius*, *contubernālis*, comes, *condiscipulos*’; OHG *geferto*, *gefarto*, from *fart* ‘journey’; *gehlaeða* (-n) m., ‘companion, comrade, *socius*’; *gemæcca* (-n) m., ‘companion, consort’; OHG *gimahho*, from *gimah* ‘fit, match’; *gesið* m., ‘companion, follower of chief or king, *socius*, comes’; OHG *gasint*, *gisindo*; ON *sinni* ‘fellowship’ (Buck 1949:1346–47). The only direct cognate with Gothic *gahlaiba* seems to be OHG *ga-leipo* (Lehmann 1986:139). Historical records, however, inform us that the OHG territory was invaded by the Visigoths during the 4th century AD (Heather 1996: 250–58) and they undoubtedly brought the word with them. This information casts doubt on the validity of OHG *ga-leipo* as a cognate. On the other hand, there are several forms with the *ga-* prefix as well as many cognatic forms for the word *hleib-*, OE *hlāf*, ‘leavened bread made with wheat flour’ but we shall return to this point below.

In search of evidence for the relevant linguistic contact between Gothic and Late Latin speakers, and thus for a context for the borrowing from Latin, we now turn to historical information as it relates to Gothic history and texts.

6. HISTORICAL EVIDENCE: THE GOTHs. Germanic soldiers had infiltrated the Roman army since the first century AD. During the 3rd century, many Germanic tribes were invited to settle on vacant lands of the empire. By the 4th century, in the west, the bulk of the Roman army and its generals were Germanic (B. Campbell 1999:218). In the east, the Visigoths obtained permission to settle as allies inside the Roman Empire and in 376 AD settled in the area west of the Danube (Modern Bulgaria). After Theodosius I had died, the Visigoths, under the leadership of Alaric, invaded Italy and sacked Rome in 410 AD. Then, two years later, in 412 AD, guided by Athaulf, they crossed the Italian Alps, entered Southern Gaul, where they joined a confederacy of Burgundians and Alans, and established the kingdom of Toulouse in 418 AD¹³. In turn, the Ostrogoths, under the command of Theodoric, entered Italy in 493 AD, seized Ravenna, made it their capital, and founded the great Ostrogothic Empire which lasted till 554 AD (Heather: 1996:216–58)¹⁴.

Our knowledge of Gothic, the earliest attested Germanic language, is derived primarily from the surviving manuscripts of a Bible translation made in the 4th century by the Visigothic bishop Wulfila¹⁵. The surviving manuscripts, however, are not

originals but much later copies believed to have been transcribed in northern Italy during the period of Ostrogothic rule, around the first half of the 6th century AD (Bennett 1980:226–27)¹⁶. As a consequence of constant raids and of the establishment of the Ostrogothic Empire, plenty of linguistic and cultural contact existed between the two groups. At this point, it is entirely possible that the Gothic term formed the basis for the Latin word ‘companion,’ except for the fact that Goths followed the Arian Creed while the Italians followed Papal Rome. There was enmity between the two people making the situation not conducive to borrowing a word which indicates social and/or religious kinship. To the Italians of the time, the Goths represented an alien culture and religion. Relevant, at this point, though, is a characteristic of Germanic social structure.

7. THE GERMAN *COMITATUS*. The Germanic tribes, nomadic by nature, had developed the practice of *comitatus*. According to Tacitus (*Germania* 13–14) young men attached themselves to a chief and became his associates and followers. Tacitus calls this type of follower a *comes* (*com* + *eo*) ‘companion,’ literally, ‘one who goes with another.’ Reportedly, a *comes* was an ornament for the leader in time of peace and a means of defense in times of war. In fact, chiefs achieved prominence based on the number of followers that they could gather around themselves. In return, these chiefs provided their followers with shares of booty, feasts, and entertainment aplenty. This state of affairs is celebrated in the Germanic literature from *Beowulf*, to the *Nibelungenlied*, to the Icelandic Sagas (Lindow 1976). This *comitatus*, a ‘company, escort, retinue,’ as Tacitus refers to the troop of faithful armed followers, as a rule, ate and drank and even slept together in the great hall. The practice of surrounding oneself with a *comitatus* was retained by the Germanic tribes even when Romanized, for, in the late Roman Empire, they encountered the same practice¹⁷. Indeed, not only did the emperor have his own praetorian guard (B. Campbell 1999:219), but in addition, there was scarcely a member of the Roman aristocracy who was without his own private body guards (Bloch 1961:155).¹⁸

8. SUMMARY. To conclude the first part of our inquiry, the weight of the cultural evidence seems to point to the notion of a ‘companion-at-arms’ as being an intrinsic part of Germanic society and thus, terms for it must have existed as well. In that case then, one wonders why Wulfila would have coined a new word for his Bible translation. The data, in point of fact, shows that Wulfila had at his disposal at least two other words denoting this type of companionship; namely, the word *gasinpa* ‘traveling companion,’ which could perhaps better be rendered as ‘companion of expedition’ for their movements were more akin to expeditions than to peaceful traveling; and the word *gadrauhts* ‘soldier.’ It is possible that Wulfila’s coining of a new word had a very specific purpose; that of highlighting the sharing of the sacramental bread. In that case, the notion of ‘common’ assigned to the prefix *ga-* by some scholars (see sections 4 and 5) could refer to the sacramental experience. Actually, according to the Christian Creed, the bread is the body of Christ and Christians share it, all in common¹⁹. Wulfila, who was a very careful translator, may thus have coined this specific word to

render the notion of companionship devoid of a military nuance. And indeed, looking at the two attestations in Gothic, we find that in John 11:16 neither the Latin term *condiscipulos* nor the Gr. *συνμαθητής* held the notion of companionship at-arms. It is only in Philippians 2:25 that the Gothic term *gahlaiba* translates Latin *commilito* and Greek *συστρατιώτης*, each of which does contain a semantic component with a trace of military nuance. First, one must remember, however, that this notion can only be inferred in the sources for the Gothic translation and is not found in the Gothic term itself. Second, even in Late Latin *commilito* had acquired the meaning of ‘comrade’ while still retaining its original meaning of ‘fellow soldier’ (Lewis & Short 1993:378), and the same can be said for the Greek term. It is therefore entirely possible that Wulfila did not want to use *gasinþa* nor *gadrauhts* because he was refraining from making any reference to a military semantic component profiled in his sources. If this is true, then the term *gahlaiba* would simply have the connotation of a ‘one who has bread with (others)’; that is, an ‘associate’ in a religious sense. Support for this assumption can be found in the texts themselves. As a case in point, in 2 Philippians, the Apostle Paul writes to his congregation to inform them that instead of himself, they will meet with his envoy. A previously ill missionary, Epaphroditus is introduced as Paul’s brother, coworker and ‘fellow soldier’, that is, an ‘associate, companion’. Thus, the literary context itself makes an overt reference to a ‘bond’ between Paul and Epaphroditus rather than to military nuance or context. In addition, in the Naples Deed, the authors of the signatures on the document who identify themselves as ‘companions’, are an Arian priest, a deacon, and two amanuenses, a scribe and a cleric (Scardigli 1964:189). In other words, these four are men of the cloth, ‘brethren’, if you will. Again, there is no direct reference to a military connotation other than, perhaps, to a male association. Two further historical pieces of information can be cited in support of the above proposal. The first is that while Wulfila, and his followers, had incurred persecution for having rejected the Nicean Creed, there is no evidence of these Goths fighting back. The second is a statement made by Wulfila’s biographer who informs us that the only religious book not translated by Wulfila was the Book of Kings. The reason given for this lack was Wulfila’s specific wish to eliminate any reference to war when addressing his constituency (Walford 1855, *Philostorgius* 11.5). It is possible then, that Wulfila coined a word which his new believers plainly understood within the religious context and whose connotational meaning did not entail the implication of military nuances. If available, the word *companion*, allegedly meaning *cum-panis*, could have supplied Wulfila with the necessary paradigm. This brings us to the second part of our analysis and the exploration of the etymology of Lat. *companion*.

9. THE SCHOLARSHIP OF LATIN *COMPANIO*. According to the scholarship, the Latin term ‘companion’ is derived from an unattested **cum-pānio-ōnis* from *cum* and *panis*. The *Thesaurus Linguae Latinae* (1906–1912:2004) states its meaning as ‘*membrum, socius*’ and gives as its first occurrence the Lex Salica. The following entry, which is also relevant to our investigation, lists LL **cum-pān-i-um, -i*, as a neuter form with the meaning of ‘*contubernium, societas*’. Herein again, the Lex Salica is cited as pro-

viding the first occurrence. Indeed, Du Gange in his *Glossarium*, under the heading of *compagus*, lists *compagnons* as being earlier *compains*. Then, following the term *companium*, which he glosses as ‘*contubernium, societas, Compagnie*’, he adds: ‘*Pactus Legis Salicae tit. 66. §2: Si quis hominem ingeneuum, qui Lege Salica vivit, in hoste in Companio de Companiei suorum occiderit, in triplo componat... Galli dicerent, “En la compaignie de ses compagnons”*’ (Du Gange 1954:461). Du Gange goes on to suggest that the lexeme *companion* may have arisen from the practice of sharing bread among military people and thus *companium* may stand for *campanium* but gives no reason or data for the assumption (Du Gange 1954:ibid). The proposition may have arisen from the fact that this particular segment of the Salic text refers to a law articulating the penalty to be imposed on a free man, if the latter, in the ‘company’ of his ‘companions’, (gang members?) killed another free man who was serving in the army. Of note is that, though not a military nuance, this usage of ‘companion’ and of ‘company’ definitely holds a militant nuance.

Diez (1969:106) under the heading of It. *compagno* gives Sp. *compaño*, Prov., OF. *compaing* ‘gefärté’, from which *compagnia* and the verb (*ac*)*compagnare* from MLat. *companium* ‘company’ all from *cum* + *panis*. He states that the etyma were fashioned after the pattern of OHG *gi-mazo* or *gi-leip* ‘brotgenosse’. Diez further suggests that *compagnon* could have been derived from *compāgānus* but only if the accent had shifted to the root which he doubts, of course, due to the nature of the long vowel (ā) in the suffix²⁰. Diez also lists other possible sources for the two etyma such as Latin *compaginare* as well as Provençal, Catalan *companatge*, but makes no further comment.

Meyer-Lübke (1935:2093) in his *Romanisches etymologisches Wörterbuch* gives *companion*, *-one* as an unattested form with the meaning of ‘Genosse’ formed after the Germanic form *ga-hlaiba* and cites Diez in support. But, in a discussion of the suffix *-ia*, and on its archaism, Meyer-Lübke (1974:496–97) remarks that even in Latin the *-ia* suffix created collectives. Among a number of such formations he lists *compania*, It. *compagnia*, OFr. *compagne*, Sp. *compaña*. He then goes on to state that the term *compania* must be a formation after a Germanic *gahlaibi* in the same way as the term *companion* is formed on the model of *gahlaiba*. We shall return to this point below.

In other words, while in Gothic we have at least six separate attestations: two in the Bible passages and four in the signatures of the Naples Deed, no attestations are available, either in Latin or in Vulgar Latin, for the terms *companio* and *companium*. All references cite unattested forms. This prompts us to seek evidence in Old French.

10. RISE OF THE FRANKS: FROM GALLO-ROMAN TO OLD FRENCH. The Romanization of Gaul began in 56 BC with Caesar’s conquest. Soon after, the Gallo-Romans began to use Latin, albeit the military vernacular brought by the legions and not Classical Latin²¹. Between the 3rd and 4th centuries, Germanic invasions and Christian missionaries further promoted the adoption of Latin, though by this time, the local idiom showed Gaulish influence both on the phonological and lexical levels. Not much later, the Franks, who had earlier settled in Gaul as Roman allies, engulfed the Visigothic Kingdom of Toulouse and, during the latter part of the 5th century, gradually over-

took the government of Northern Gaul under the leadership of the Merovingians²². As these Germanic tribes coalesced with the Gallo-Roman population, they relinquished their language in favour of Latin. At the beginning of the 6th century, under King Clovis, they established the Frankish Kingdom. Indeed, the Franks, who had repelled Aryanism with the Goths, along with king Clovis accepted Christianity on Christmas 496 AD. (Rickard 1974:8–35). It was around that time that the first version of the *Pactus Legis Salicae* was most certainly written down²³ bearing the first attestations of both the term *compagnon* and the term *compagnie*. The variety of different versions of the text have presented endless challenges to editors. The law version referred to in this paper is a translation based on the late 8th century text, the oldest available text, amended with the later capitularies as well as the so-called Malberg glosses (germanic glosses) that appear in some manuscripts (Drew 1991).

11. ATTESTATIONS OF *COMPANION*. In addition to the evidence in the *Pactus Legis Salicae*²⁴, a second set of attestations of both terms can be found in the *Chanson de Roland* (Berkeley Digital Library 1995), a poem which dates toward the end of the 11th century (Duggan 1969; Rickard 1974). These texts, however, are not the oldest specimens of Old French²⁵. Actually, the first complete text in the new language, the *Serments de Strasbourg*²⁶, is from 842. It is the record of an oath sworn by two of the three grandsons of Charlemagne against their older brother. From the *Serments*, it is evident that, by this time, a large segment of the population must have spoken the vernacular while the elite and the learned, especially within the church, continued to speak Latin. We know, in actual fact, that by 813 Latin had become completely incomprehensible to the common people, and it must have been so for several hundred years before that date, because in that year, the *Council of Tours* granted permission to the clergy to preach in the vernacular as the people could no longer understand Latin (Rickard 1974:35).

An interesting pattern in the usage of the term ‘companion’ is evident in Joseph J. Duggan’s *A Concordance of the Chanson de Roland* (1969)²⁷. The vocative/nominative form, *cumpainz* appears 24 times. Only once it is written as *cumpain* (verse 2000 ‘*Sir cumpain, faites le vos de gred?*’)²⁸. The remaining 23 occurrences, which are written *cumpainz*, can be subdivided into two categories: First, the term is used by the narrator to indicate a member of the pair composed of Roland and Oliver; Second, the term is used by the members of the pair to address one another²⁹. In only three instances does the word *cumpainz* refer to someone other than Roland or Oliver. As a case in point, in verses 1269, 1380 and 2404, *cumpainz* refers to either Gerier or Gerin, friends who also are perceived as a pair³⁰.

The word *cumpagnun* occurs 17 times, 10 times in the singular and 7 times in the plural. In the plural, the term most often designates the 12 peers that made the inner-armed troop, at other times it refers to the soldiers at large. The word *compagnon* occurs but once while *compagnie/cumpaignie* occurs several times, both with the abstract meaning of ‘togetherness’, that is, referring to the relationship that bound the

compagnons as in verse 1735; and with the concrete meaning of 'military troop', as in verses 587, 912, 1087, 1471 and so on (Duggan 1969:67–68).

Though an in depth study on the usage of *cumpain* vs. *cumpagnun* is beyond the scope of this paper, one must reckon with the great deal of variation between spellings. These discrepancies, of course, may be simply the result of regional differences, for without a doubt there were many dialects spoken at the time (Rickard 1974:46–51) and the *Chanson* must have been performed in what the people of the period referred to as the local 'romanz' or '*lingua romana rustica*'. Thus, as an oral performance by poets and troubadours, undoubtedly, the *Chanson* did reflect many of those dialectal differences. In addition, Old French, at this time, was still viewed as an oral medium of expression, and consequently, not worthy of being written down (Beaulieux 1967:13). Not surprisingly, the spelling, which also at this time had not yet been codified, added to the variety of spellings. Last and most important, however, is the fact that when it was finally written down, the way in which the words were represented in writing often depended on the scribe. Those clerics who were aware of, or even just inferred, Latin origins may have tried deliberately to show the relationship orthographically (Beaulieux 1967:x). In any case, the few surviving documents from this period still provide considerable insight. Of all the alternations, what catches the eye is the consistent fluctuation between *compain* and *compaing*. We will address this point below.

12. MORPHOLOGICAL ANALYSIS. Without a doubt, the earliest attestation of the French term *compagnon*, *compaing*, *compainz* and so on, 'companion' are, at the very least, more than four centuries later than those of Goth. *gahlaiba*, i.e., the *Lex Salica* (c. 800), or roughly between 500–700 years later. i.e., the *Chanson de Roland* (c. 1080). The widespread agreement on the meaning of the term in Old French contrasts sharply with the many alternative spellings which are also evident in later Medieval French literature. For instance, the *Dictionnaire de l'Ancienne Française* (9–15 century) reports *compan*, *compens*, *compainz*, *cumpainz*, *compeinz*, *compoinz*, *compoins*, *compaings*, *compaing*, *compoing*, all subject cases of OF. *compaignon* (Godefroy 1982:202)³¹.

In his *American Dictionary of the English Language* (1828), Noah Webster presents a very interesting suggestion. Under the entry *company*, he states: '...not from *cum* and *panis*... but from *cum* and *pannus*... What decides this question is the Spanish mode of writing the word with a tilde... *pañó*, "cloth" whereas *panis* "bread" is *pan*'. Webster goes on to define the meaning of 'company' as 'a band or number of men under one flag or standard'. Though Webster may not be an authority on Romance philology nor, for that matter, on Old French phonology, he does proffer an alternative aimed at reconciling the military nuance exhibited by both the terms for *companion* and *company*, and their postulated morphology and in so doing, indicates interesting investigative venues which we will explore below.

There is more than one phonological change in Vulgar Latin, and in Old French itself, that could have produced the palatalized nasal in the word *compaing/compain*. First, the palatalized nasal in French, in many cases, originated from the *n* + front vowel so that Lat. *vinea* became Fr. *viña*. Second, the voiced velar, which had indeed

already become very unstable since Classical Latin times, underwent a process of palatalization in several environments. For instance, in initial position and followed by *-a-*, the velar palatalized and words like Lat. *gaudere* > OF. *jouir*. In medial position, when the *-g-* was followed by front vowels it disappeared altogether, thus from Lat. *regina* > OFr. *reïne*, Prov. *reina* (Bourciez 1930:162). This palatalization process occurred not only when the velar was followed by vowels but also, for instance, when the velar was in a consonant cluster with *-n-* as in *-gn-*. Lindsay (1894:292) states that, in Latin, even at the beginning of the 2nd century BC the consonant cluster *-gn-* had by then become *-n-*. In fact, in Romance languages Lat. *co-gnoscere*, has reflexes devoid of the velar; thus It. *conoscere*, Prov. *conoiser*, Fr. *connaître* < OF. *conoistre*, Cat. *coneixer*, Rum. *cunoaște*. Fouché (1961:605) explains it as a process of assimilation so that *-gn-* gives *-ñ/ñ-* which was written, at a much later time with the diagraph *-gn-*; thus Latin *dignus* became OF. *deññyer*. Such type of gemination, he suggests, lasted until the 11th century (Fouché 1961:809). In the following centuries, a large number of learned words were reintroduced into French from Latin and the new words took on the palatalized pronunciation as well³². In support of the notion that this sound change began at an early period in French, Fouché cites several examples: OF. *pre-nant* < *praegnante*, *dine* < *dignum*, *rene* < *regnum* (ibid 607).

In addition, the palatalized nasal of Old French could also originate from a consonantal group *-nc-* or *-ng-*. Mendeloff (1969:23), Fouché (1961:605), and others state that, with noted exceptions, the *-ng-* cluster simplified to *-n-* and was then subject to palatalization (Beaulieux 1967:75) i.e. *plangente* > *playnant* > *playnyant* > *plaignant*. If one takes this latter phonological change into consideration, based on the alternative spellings of *compaing*, *compain*, and *compaign*, besides deriving *companion* from an underlying form *cum-panis*, as some of the scholars would have it, the Old French word could also have derived from a Late Latin form *com-pāngo*.

The verb *pango* ‘to join, to unite several parts into a whole’ has an alternate form *pāgo* ‘to fix, covenant, stipulate, contract’ (Lewis & Short 1993:1297) and several compound forms³³ among which *com-pingo/com-pango*³⁴. It is possible that from *com-pingo/com-pango* ensued a nominalized form *com-pango* ‘the one who joins, unites, associates, socius’ and a secondary form to which the suffix *-ia* denoting ‘a conditions’, or more likely a ‘collective’, had been affixed to the root producing the term *com-pang-ia* with the meaning of ‘a union, association’. When these forms underwent the process of palatalization in Old French, probably first *compayngia* > *cumpaynyia* > *cumpaïnie*³⁵ and then by analogy *compango* > *cumpaynyio* > *cumpaño*, the velar, at a first stage, became palatal as it partially assimilated to the preceding nasal so that the cluster *-ng-* became *-ndy-*. At a second stage, the *-dy-* of the *-ndy-* cluster completely assimilated to the preceding *-n-* which, because of the following front vowel, palatalized resulting in a cluster *-ñny-*. With the sound change of *ng* > *ñny*, later > *ny*, two homophonic etyma would have resulted: the first *cum-paiño* which had the meaning of ‘with bread’ and the second *cum-paiño* which had the meaning of ‘socius’. Later, as the writing became canonized, these forms were written alternatively as *compaign*, *compain* or *compaing*, and so on. As a result, the meaning of this conflation of two

different terms would encompass not only the meaning of ‘the one with the bread’, or ‘he who is with bread’—which will be elucidated below—but also ‘he who joins, unites, *socius*’. This solution would account for the military nuance exhibited by the two compounds. Indeed to become a Roman *comes*, or even a member of the Germanic *comitatus*, an oath had to be sworn to sanction their association. Thus, as we shall see below, the semantic overlap could have been aided by the existence of the practice of *comitatus*, a practice familiar to the Franks, in which the *companions* of a leader were indeed fed by him but also bore arms for him. The proposed solution would also avoid a number of required semantic shifts which, would be necessary in order for the semantic sphere of the term to encompass the meaning of ‘union, association’ if, initially, the word simply meant *cum* + *panis*, ‘one who has bread with’³⁶.

The merge of two forms, because of their phonological similarity, is not an unknown phenomenon (Weinreich 1970:47–62). For instance, English *belfry* ‘bell tower’ derives from OF. *belfroi*, earlier *berfroi* from a Germanic compound of **berg* ‘high place’ and *frij-* ‘safety, peace’. In the Middle Ages, speakers reanalyzed the compound and began to identify the first syllable *bel-* with the free morpheme *bell*, so that the original meaning shifted to that of ‘bell tower’. A modern case is found in the word *hamburger* which most English speakers reanalyze as ‘*ham*’ plus the word ‘*burger*’ having no inkling of its etymological origin. In fact, native speakers of American English, in particular, are often puzzled by the absence of pork meat, that is, of ‘*ham*’ in their ‘*hamburger*’³⁷. This type of false analogy, also known as folk etymology—a process by which somewhat similar words are altered, either phonologically or in spelling, to conform even more closely to the pattern that draws them—plays an important part in language change, and more specifically, in the alteration of a word-form to fit a more acceptable pattern. Folk etymology is itself a kind of semantic assimilation. Further support, for the supposition stated above, can be found, as we have seen, in the historical context. In French Medieval times, a *companion* was often part of the household of his leader. To his leader he was bound through an oath of fidelity, and by his leader he was housed and given food and drink, and later even land. In exchange, he bore arms against the enemy. In other words, he was a warrior (Bloch 1961).

13. THE INDO-EUROPEAN WARRIORS. According to IE scholars, the notion of the warrior within IE languages is rooted in the war-band organization. A ‘young man’ was defined as an ‘(armed) youth’, PIE **h_a iuh_x -n̥-ko-* ‘youth’ who took up arms as a member of a war-band PIE **korios* (McCone 1987:103). Reconstructed vocabulary hints at warrior clusters, for instance, PIE **korios* refers to an ‘army, war-band’ while **leh₂ uos* and **teutéh_a* refer to the ‘people under arms’. Literary evidence suggests the existence of two kinds of bands: the one composed by young warriors in training and the established *Männnerbund* or *comitatus*. These war-bands were linked to a leader by personal ties as evidenced by the Ir. *fianna* ‘war and or hunting band’. Indeed, in the Irish *Tàin Bó Cúalgne* or *Cattle raid of Cooley*, the expression *in maccrad*, which is rendered as ‘the youths’, clearly refers to the young band of the king and is associated with Cú Chulainn, their leader. The same situation can be found in *Beowulf* (*Beowulf* 20–25)³⁸

and in the Anglo-Saxon poem *The Battle of Maldon*. The Gr. *ephēbeia* also trained to obtain full status as warriors (Mallory & Adams 1997:632). This type of war-band, joined to its leader by oaths and personal ties, is described by Tacitus who identifies it as the Germanic *comitatus*. Indeed, in Frankish Gaul, kinship ties and personal ties by oaths were equally binding and constituted one of the strongest social bonds (Bloch 1961). Noteworthy is that in the early Frankish kingdom there was not an army run by the state as it had been in Roman times, there were only ‘companions’ whom the king and chieftains attracted to themselves (Bloch 1961:153). The chiefs, especially the young chiefs, used to gather around themselves ‘companions’ or *gesinþans*, literally, ‘companions of expeditions’. Tacitus, thoughtfully equaled *gasind* to *comes*. These companions were led to battle or in raiding expeditions by their chief who, in between raids, offered them hospitality in their great halls and lavished them with immense amounts of food and drink. In exchange, the war-band supported its chief not only in wars but in vendettas as well (Bloch 1961:154). The Germanic *comitatus* described by Tacitus in the first century AD continued for several centuries, particularly in the Frankish kingdom, giving later rise to the feudal system.

14. THE ONOMASIOLOGY AND SEMASIOLOGY OF ‘COMPANION’ IN I-E. The notion of the type of companionship described above is a very old concept in Indo-European languages and is attested in most of the literary traditions of the descendant languages. Forms which have proliferated in the attested languages include derivatives of pronominal stems signifying ‘one’s own’; of verbs for ‘follow or attend’; and of compounds made with prefixes denoting the notion of ‘with’ (Buck 1949:1346). As a case in point, Lat. *sodālis* ‘companion’, OCS *svatŭ* ‘relative’ *svobodŭ* ‘free’, Skt. *svaka-* ‘relative’ are from the reflexive pronominal stem PIE **s(w)e-dh(o)-* < **s(w)e* while Skt. *sākhā-* and Av. *haxā-* ‘friend, companion’, Gr. *ἀσσεῖω* ‘help’ are from PIE **sekʷ-* ‘follow’ whose thematic form PIE **sōkʷ-h₂-ǵs* ‘follower, companion’ gives Latin *socius* ‘partner, companion’ and Proto-Germanic **sagwja-* from whence OE *secg* / ON *seggr* ‘warrior, follower (of a leader in combat)’. Finally, Lat. *comes* which is a compound of *com-* ‘with’ and *i-t-* < *ire* ‘go’. (Pokorny 1959:896–97; Buck 1949:19.51, 19.53; Mallory & Adams 1997:115–16).

The meanings developed by the various terms appear to fall into three distinct categories, each denoting the notion of partnership in a specific environment. The first category relates to travel, i.e., OE *gefēra*, *foera*, ME *yfere*, ‘traveling companion’, from OE *faran* ‘go’, OHG *giferto*, *gafarto*, MHG *geverte*, from *ga* + OHG *fart*, OE *færd*, OS *fard* ‘military expedition, army’; Goth. *gasinþa*, OE *gesinþ*, OHG *gasint*, ‘traveling companion’, from *ge* + *sinþ*, ‘way, journey’, *ga-sandjan* ‘accompany’, *gisindi* ‘retinue’ ON *sinni* ‘fellowship, company’ MW *hennydd* ‘companion’; *cydymaith*, a compound of *cyd-* ‘co-’ and *ymdeith* ‘travel’. Finally, Skt. *sahāya* from *saha* ‘together’ and *aya* ‘going’.

The second category in which the terms can be grouped refers to the sharing of lodging, i.e., Fr. *camarade* ‘chamber mate’ from *camara*, ‘chamber’, MHG *stalbruoder*, *stalbröder* ‘roommate’ from *stal* ‘place, stall’ and ‘brother’; OHG *gesello*, *gesellio*, MHG *geselle*, Dutch *gezel*, with reiteration *metgezel* ‘house mate’ from OHG *sal* ‘hall, building’.

Lastly, there are terms denoting a bond, a partnership in general such as Goth. *gadaila* from *ga* + *daila* 'share', NE *partner* from *part* 'share', OF. *parcener* from Lat. *partitionarius* < *pars*. Lith. *beñdras* 'companion', Gr. *πενθερός* 'father-in-law', Skt. *bándhuṣ-* 'relative, kinship' from PIE **bhendh* 'bind'. The only two terms having to do with the sharing of food are Goth. *gahlaiba*, 'sharing bread', OHG *galeipo* and OHG *gimazo*. The first apparently originated as a religious term (see sec. 8) . The second, OHG *gimazo*, seems to have encompassed drinking as well as eating and feasting (Lehmann 1986:247).

15. CONCLUSION. What we do when we engage in the techniques of Historical Comparative Linguistics methodology is to analyze the data in relation to a theoretical framework. What we get out of such an undertaking is often more questions than answers. As a case in point, from our excursus, it is apparent that in spite of advances in the field, the theoretical assumptions related to identifying semantic loans have not yielded helpful results. That is, we have not been able, at least so far, to ascertain the direction of the semantic loan under investigation by examining deviation in phonotactics in both Gothic or Latin (Old French); nor have we been able to pinpoint morphological complexity in one of the languages as opposed to the other. Lastly, we have not been able to identify a group of cognates in either language. Thus, the question of whether or not Lat. **companiono* is a calque from Gothic *gahlaiba*, or vice versa cannot, as yet, be put to rest.

We can make, however, some deductions from the data we have gathered. From both the linguistic and the historical evidence, the Gothic term clearly appears to be a separate and distinct coining, unconnected to Lat. *companion*. Wulfila, who had at his disposal two other words with the meaning of 'companion', namely, *gadrauhts* and *gasinþa*, to render the equivalent terms of the Greek and Latin Bible, chose to coin a new word. His apparent motivation seems to have been the desire to supply his religious constituency with a word devoid of a military nuance. Worthy of note is that this coining dates back to the 4th century and that there is no attestation, at that time, of a Latin term which could have provided the basis for a semantic loan into Gothic.

The notion of bread is very important in the religious context but we know that, from a sociological perspective, the notion of bread was also very important in Germanic as the Old English titles, 'Lord' and 'Lady', *hlāfweard* and *hlāfdige* seem to indicate. It is just possible, therefore, that the *n*-stem Germ. **xlaifan*⁻³⁹ ensued from the metonymic use of 'loaf of bread' for 'one associated with the bread provided by his lord'; in other words, a 'client, recruit'. In that case the *ga-* prefix would have the same collective meaning as the one found in OE *gebröder* and NHG *Gebirge* 'mountain range' making the attested term *gahlaiban* 'fellow loaf(men)'⁴⁰.

As for the etymology of Old French *companion*, the earliest attestations go back to the 8th century and are thus rather late in comparisons to the Gothic attestations. What is more, the pragmatic contexts in which the word appears do not support the meaning of 'he who has bread with', deduced by some scholars from a putative morphology of *cum* + *panis*, but rather, that of 'an associate, companion-at-arms'.

Scholars have attempted to reconcile the military semantic component of the word 'companion' with the morpho-phonological sequence *cum-panis* by suggesting that soldiers shared bread. Eating bread together was, in fact, a military practice (Meillet 1966:277). And indeed, the Roman military unit, the *contubernium*, composed of 8–10 men under the leadership of one commander, carried and made their own bread. Bread was so plentiful and came in so many varieties in Rome that Pliny the Elder could not name all the different types (Pliny *Nat. Hist.* Book XVIII, XXVII, 105). What is more, bread was such an essential staple in the Roman army diet that it had its very own name: *panis militaris*. This *panis militaris* came in two varieties, *panis castrensis* for when the troops were encamped and *panis mundus* for when they were on the march (Faas 2003:191). Unquestionably, the Romans believed that 'bread was the only food fit for soldiers' while any other type of food, including meat, was viewed by the military men themselves as being demeaning and unfit for a real Roman soldier (Dupont 1993:125).

Work in experimental archaeology supports literary reports that Roman soldiers, at the far reaches of the western empire, carried grain and made their own bread (Junkelmann's 1997:11–13, 136). If we take both the cultural and historical contexts into consideration, it is entirely possible, then, that the Roman soldier may have been referred to as 'the one with the bread'. This metonymic shift must have developed in Gallo-Roman times and would account for the term being attested so late. Of relevance here is Procopius' account of how the remnants of the Roman army in northern Gaul, which came to serve under Frankish kings, maintained and preserved many of their military traditions, including foot attire. Among the preserved traditions there may have been the making and carrying of bread. The Roman army in Gaul had, in effect, long been Germanized; conversely, the Frankish army had long been Romanized. Procopius' story suggests some kind of fusion of the two military systems may have come about, presumably under the earliest successful Frankish kings, Childeric or Clovis, who date back to the 6th century AD (*Procopius Germania*, Wars V. xii. 13–19). It is thus possible that the creation of the term *cum-pan-io*, through the addition of an adjectival suffix denoting a characteristic or profession, became a metonym for a 'soldier' at this time⁴¹. Such notion, then, may have been adopted by the Anglo-Norman. In which case, OE *hlāfweard* could be explained as a military term⁴². A homological parallel involving a metonymic shift from 'a grain staple' to man is supplied by Pliny who states that gladiators were nicknamed 'barley-men' after their basic staple: 'gladiatorum cognomine qui hordearii vocabantur' (*Nat. Hist.* Book XVIII, XIV). One can easily suppose that the appellative *cumpan-io* was used in the same speech context as that of *hordeario* < *hordearius* when members of the two different fighting units had occasion to address each other, perhaps in non-complementary ways. If so, the two appellatives could easily have been subject of further analogy based on their immediate juxtaposition to one another.

To sum up, the data taken as a whole seem to suggest that, through a metonymic shift, a Gallo-Roman soldier was designated as a *com-pan-io*, that is, 'the one with the bread'. Concurrently, phonological changes in Early French, caused the nominalized

form of the verb *com-pango* ‘he who joins, unites, *socius*’ designating a *comes* to be reanalyzed as *com-pan-io*. As a result of folk etymology, speakers merged the two different words both at the morpho-phonological and at the semantic level. This proposal, of course, is only tentative. To fully settle the question, further investigation is necessary in the area of borrowing, loanwords and semantic translation as well as in the area of Late Latin and French morpho-phonology. These preliminary results may not satisfy everyone, but present a great opportunity for those interested in the techniques employed by historical linguistics to observe the interplay between cultural history, regular sound change, and the individual history of each, and every word.

- ¹ Borrowings presuppose language contact situations and require speakers with some degree of bilingualism.
- ² *Mbakara* is a loan from Efik and means ‘white man’.
- ³ Wulfila was from Cappadocia, the largest province of Asia Minor located in what is today eastern Turkey. It was bordered in the north by Pontus, in the east by Syria and Armenia, in the south by Cilicia, and in the west by Lycaonia.
- ⁴ The term *loan translation* is itself a calque of modern German *Lehnübersetzung*.
- ⁵ <http://extranet.ufsia.ac.be/wulfila/Corpus/Corpus.html>.
- ⁶ Following the established convention, square brackets [] indicate deletions; angular brackets < > indicate additions; italic indicates that either the characters or the words cannot be identified within a certain degree of certainty. Abbreviations used are: [CA]=Codex Argenteus; [A], [B], [C]=Codex Ambrosianus A, B, C; [Naples]= Naples Deed.
- ⁷ This is the Latin Bible, or ‘Vulgate’. Translated from Hebrew and Aramaic by Jerome between 382 and 405 AD. This text became known as the ‘versio vulgata’, that is, ‘common translation’ (<http://www.biblegateway.com/cgi-bin/bible?language=latin>).
- ⁸ <http://www.greekbible.com/>.
- ⁹ Gaul. *co(m)-* Lat. *co(m)-*, Osc. *com/n-*, OIr. *co/um-*, *co/u-* all deriving from PIE **kom-*. Thus OIr. *com-arbe* ‘fellow-heir’ Goth. *ga-juka* ‘companion’ Lat. *con-jux* ‘spouse’ (Lehmann 1986:133). Some scholars consider Gmc. *ga-* < PIE **ǵʰo-*, a semantic equivalent of Italo-Celtic **kom-*.
- ¹⁰ Formed with a derivation in *-*ti* from the verb *driugan*, *drauhti-witōþ*.
- ¹¹ In Luke 2:44 the expression *in gasinþjiam*, a dative plural presupposes a variant *gasinþja*.
- ¹² Seebold considers *miþ gasinþam* a corruption of the text which should read *miþgasinþam* instead (1974:10).
- ¹³ The Franks successfully kept the Goths away from the greater part of Gaul.
- ¹⁴ The Ostrogothic Empire included Italy, Sicily, the areas of Dalmatia, Upper Rhaetia, and later on, Provence. There must have been a number of bilingual people.

- ¹⁵ Wulfila, also referred to as Ulfilas or Ulphilas, probably born in 311, was a descendant of Cappadocians captured by the Goths from the north of the Danube during their raids in Asia Minor. As a young man he was consecrated Bishop by the Bishop of Nicomedia, Eusebius. Shortly after his consecration he returned to Dacia and worked among his fellow-countrymen as a missionary. After a decade or so he was compelled, because of persecution, to seek refuge in Moesia with many of his Christian converts. It was at this time that he conceived the idea of translating the Bible into Gothic. Wulfila translated 'all the books of Scripture with the exception of the Books of Kings, which he omitted because they are a mere narrative of military exploits, and the Gothic tribes were especially fond of war, and were in more need of restraints to check their military passions than of spurs to urge them on to deeds of war' (Philostorgius, *Hist. eccl.* II, 5).
- ¹⁶ These texts include considerable portions of the New Testament, and minor parts of Nehe-miah from the Old Testament. Other remnants include some fragments of a commentary on St. John's Gospel (*Skeireins*), a fragment of a calendar, two deeds containing some Gothic sentences, and a 10th-century Salzburg manuscript which gives the Gothic alphabet, a few Gothic words with Latin translation, and some phonetic annotations (Bennett 1980:26–27).
- ¹⁷ Constantine split the army into two. Some troops were stationed along the borders, others were part of his retinue or *comitatus* and were therefore called *comitatenses* (Codex Theodosianus 12,1,38 <http://www.gmu.edu/departments/fld/CLASSICS/theod12.html>). It is out of this practice that arose the '*comes rei militaris*', that is *companions of warfare*.
- ¹⁸ The so-called *buccellari* were hired soldiers very loyal to their masters.
- ¹⁹ The communion rite (Eucharist) goes back to the very beginning: Acts 3:46 ('Breaking bread in their homes' = the Eucharist); see also: 1 Corinthians 10:16–17 and 11:23–26. Thus the ritual was probably first celebrated right after Jesus' crucifixion and coincides with the beginning of belief in his resurrection. Though debated at the time of Wulfila, it did not become the creed of transubstantiation till the Fourth Lateran Council in 1215.
- ²⁰ *Compagānus* and *pāgānus*, as nouns, designated a 'country inhabitant', that is, an inhabitant of a *pāgus*. *Pāgānus* was opposed to *urbanus* 'inhabitant of the city'. Within military jargon, however, *pāgānus* acquired the additional meaning of 'civilian' in opposition to *castrensis* 'soldier'. As Christianity spread to the urban centers, the word *pāgānus* came to mean 'non Christian' (Tagliavini 1964:174).
- ²¹ The Gaulish tongue was relegated more and more to the rural countryside and by the end of the 5th century, it had all but died out. (Rickard 1974:11–15).
- ²² The Franks were a multi-tribal coalition of 'free men', who after extensive looting and pillaging concluded a peace treaty with Rome around the year 286. Subsequent to the treaty, they began a period of military service in the imperial army. Many Franks served in the legions and small groups were settled on the Rhine frontier where they were assigned defensive duties during the 4th century. These heterogeneous settlements and groups of military character slowly coalesced into two main groups: the (western) Salian Franks and the (eastern) Ripuarian Franks.

- ²³ This law code is generally considered the most Germanic of the 'barbarian' law-codes. The Lex Salica is quite clearly influenced by the Roman legislative tradition. Earlier versions credit four learned men who gave judgement according to ancient custom.
- ²⁴ There were several law codes grouped under the title *leges barbarorum* and dating from the 5th to the 9th century: the Gothic (Visigothic, Burgundian, and Ostrogothic), the Frankish (Salic, Ripuarian, Chamavian, and Thuringian), the Saxon (Saxon, Anglo-Saxon, and Frisian), and the Bavarian (Alemannic and Bavarian). The earliest versions of the Salic code have neither pagan nor Christian elements.
- ²⁵ The Reichenau Glosses, so called because they belonged to the abbey of Reichenau, on an island in Lake Constance, were probably compiled around the 8th century and are believed to be the earliest attestations. The glosses represent a list of approximately 200 words explaining certain words in the Vulgate Bible of Saint Jerome.
- ²⁶ The oath cemented the alliance between Charles the Bald (Charles II of the Holy Roman Empire) and Louis the German against their brother Lothair I. Each brother made his oath in the language of the other's followers, so that the oath might be understood by all. The version used by Louis is thus considered the oldest known text of French (Rickard 1978:30).
- ²⁷ The *Chanson*, was probably inspired by a true event. In 778, the rear guard of Charlemagne's army was attacked in the Pyrenees by an army of Basques. The earliest text of the *geste*, however, dates back to the latter part of the 11th century.
- ²⁸ The basic case form, *cumpagnun/cumpagnon* which survived in the majority of instances was the accusative. The distinction between the nominative and the accusative case continued for a time, though in the *Chanson de Roland*, one may already observe the demise of the nominative flexional -s.
- ²⁹ Ne Oliver, por co qu'il est si cumpainz; - 324; Mult par est proz Oliver, sis cumpainz; - 559; Estramariz I est, un soens cumpainz: - 941; Sire cumpainz, alum I referir!" - 1868; "Sire cumpainz, amis nel dire ja! - 1113; Dist Oliver: Sir cumpainz, ce crei, -1006; Co dist Rollant: Mis cumpainz est irez! - 1558; "Sie cumpainz, mar fut vostre barnage! -1983; "Sire cupmainz, multben le saviez -1146; "Bel sire, chers cumpainz pur Deu, que vos enhaitet? -1963; Co dist Rollant: Cumpainz, que faitesbos? -1360; E il respond:"Cumpainz, vos lefeistes -1723; Quant jel vos dis, cumpainz, vos ne deignastes - 1716; U est Gerins e sis cumpainz Gerers? - 2404; E sis cumpainz Grers en Passecerf; -1380; E sis cumpainz Gerers fiert l'amurafle: -1269; Mult par est proz sis cumpainz Oliver; -546; Cuntre lui vient sis cumpainz Oliver; -793; Co dit Rollant : "Bels cumpainz Oliver, 2207; 'Cumpainz Rollant, l'olifan car sunez:1059; que ses cumpainz Rollant li ad tant domandee, -1368; "Cumpainz Rollant, sunez vostre olifan: -1070 (Duggan 1969:68).
- ³⁰ The third pair is composed of *Ivon* and *Ivoire*.
- ³¹ The OED states that the vocative *compagn* in Romanic occurs in a gloss dated about 825 but gives no further information (http://dictionary.oed.com/cgi/findword?query_type=word&queryword=companion).
- ³² Fouché (1961: 809) 'Cependant la grafie *gn* s'était conservée à côté de la graphie phonétique. Elle est même devenue de plus en plus fréquent à partir du XIV^e siècle avec les

progrès de la latinisation. C'est à cause d'elle et par analogie avec les mots de formation populaire dans lesquels *gn* (ou *ign*) représentait *n* mouillé, que le *gn* des formes savantes a commencé à se prononcer [*ñ*] dès le XVI^e siècle et peut-être même avant. Cette prononciation a été d'abord blâmée par les grammairiens en particulier par H. Estienne. Mais elle continué à faire des progrès. Encore au début de XVII^e siècle, le mots comme *bénigne*, *consigner*, *digne insigne*, *maligne*, *résigner signe* et leur dérivé pouvaient se prononcer avec [*n*] ou [*ñ*]. A la fin du XVIII^e, [*ñ*] était devenue général. Un mot a pourtant fait exception jusqu'à nous jours. C'est *signet* dérivé de *signe*.'

- ³³ Among them, *compāgus* -i, m. 'one belonging to the nearest village, a fellow member of a pāgus, a cult title Insc. Orell. 3793', *com-pāg-in-o*, 1st declension, active verb 'to join together', *compāgo-inis*, f. and *compāges* -is also f. 'a joint, structure', *compāg-us*, -i, m., 'one belonging to the same village' and *compāg-ānus*. -i, m., 'an inhabitant of the same village'.
- ³⁴ The nasalized form, *com-pango* has an allomorphic variation, *com-pingo*. When the verb *pango* became the second member in a compound, in some cases, the short -ā- in the root became -i-, thus *pāg-o*, *pāng-o* *compang-o* but also *compingo*. The root vowel, however, remained unchanged in *de-pango* 'fix to the ground', in *re-pango* 'to set in, plant' and in *pro-pāgo* 'to set or fasten down' and its derivatives (Lewis & Short 1993:1467). Also *tāg-tāngo* gives *contingo* but *con-tāges*.
- ³⁵ When before *a, e, i*, the voiced velar first became *y* then assimilated either completely or partially to the neighboring vowels.
- ³⁶ The OED has the following meanings: 'associate, fellow, companion-in-arms, colleague, partner, journeyman, vade-mecum, appliance uniting several objects into one set'. The word company refers to 'a theatrical association, a firm, firefighter unit, army unit'.
- ³⁷ Furthermore because of this reanalysis the second member of the compound, the word 'burger' has acquired the meaning of 'sandwich', consisting of a bun and a beef patty or any other such concoction (*The American Heritage Dictionary*, 3rd edition, 1993:188) as for instance a cheeseburger, chicken burger, crab burger and so on.
- ³⁸ Swā sceal [geong g]uma gōde gewyrcean,
fromum feoh-giftum on fæder [bea]rme,

þæt hine on ylde eft gewunigen
wil-gesīþas, þonne wīg cume,
leode gelæsten; lōf-dædum sceal
in mægþa gehwære man geþeōn.

So ought a [young] man, in his father's
household,
treasure up the future, by his goods and
goodness,
by splendid bestowals, so that later in life,
his chosen men stand by him in turn,
his retainers serve him when war comes.
By such generosity any man prospers.
(Beowulf 1977:49)
- ³⁹ PG **xlaiba*-, ON *hleifr* OE *hlāf*, O Fris. *hlēf*, OHG *hleib*, Goth. *hlaibs* is widespread in Germanic, and although the etymology is disputed, most scholars do agree that its meaning was that of 'bread'. In Old English, the term underwent semantic narrowing and denoted 'loaf'. The 'piece' of bread was designated by OE *brēad*, ON *brauð*, OFris. *brād* OS *brōd*, OHG *brōt*, CGoth. *broe[d]*, from PG **brauð*-. The Old English plural *brēadru* 'crumbs' and the terms for 'honeycomb' OE *beobrēad*, OS *bibrōd* and OHG *bibrōt* support the assumption that PG **brauð*- referred to pieces of bread and indirectly support the meaning of 'loaf of bread' for PG **xlaifaz* (Huld, personal communication 29.July 2003).

- ⁴⁰ I am indebted to Martin Huld for this suggestion; Karlene Jones-Bley and Huda Ghattas for editorial remarks; and Ruth Augustine and Giovanna Rocca for assistance with research materials.
- ⁴¹ If we assume a form *com-pan-io*, 'the one with the bread' the term appears to be suffixed with *-io-* from a PIE **-yo-*, a suffix used to form verbal adjectives, especially gerundives. This suffix, in fact, is often used to create verbal nouns, though most often in the neuter and in the feminine. Thus PIE **sok^w-yo-s* 'follower, dependent', Lat. *socius* 'ally', PG *sagjaz* 'man, warrior', (ON seggr, OE secg, OS seg) OInd. *sāciya*—Gr. **όσσοσ* assured by *α-οσση-τήρ* (Lindsay 1894:319). This suffix is also used in proper names i.e., Lat. *Lucius*, and patronymics, i.e., *Octavius*, patronymic of *Octavus*.
- ⁴² Still, the most semantic accessible etymology, could very well be from Lat. *compāgānus*, glossed as 'an inhabitant of the same village' by Lewis and Short (1879: 385 Inscriptio Gruteri 209, 1). Indeed, both the Roman army and the Germanic *comitatus* grouped their members according to descent. This solution, however, would require that the word *compāgānus* undergo haplology and a shift in accent resulting in a postulated *compāg(ā)nus*.

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INVITED LECTURES
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CALIBRATION OF AGREEMENT IN THE LANDSCAPE OF MENTAL ACTIVITY

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But if idiolectal divergence never ceases, neither does intercalibration. So we come once again to the intimate dialectic interplay between the individual and the social, and see that much of that interplay is made possible exactly by the nature of language.

Charles F. Hockett.

THE SEMANTIC TERRAIN delineated by mental predicates in English relates primarily to what Whorf (1940a:164–65, see also Lee 1996:96–109) called the internal or ‘egoic’ domain of experience, contrasting it with the external. The ongoing social and idiolectal process required for speakers of a language to adjust their own referential parameters for specific words against the usage patterns of other speakers, a process Whorf (1940b:212–14) described as ‘calibration’ of ‘agreement’ and Hockett (1987:91–107) more recently referred to as ‘intercalibration of agreement’, is particularly interesting with regard to the egoic domain.

While words such as *differentiate*, *muse*, *doubt*, *pity*, *generalize*, *wonder* and *calculate* may be used to refer in part to behaviors visible to other people, the core activities they denote are internal, essentially mental, and observable (reflexively and introspectively) only by the experiencer. Each of us builds up over time, and largely unconsciously, feelings for the referential values of such terms without knowing the exact quality or range of experience that other people draw on when they use them. We may think of the way we use intentional predicates to refer to parts of our experience, and the experiences we attribute to others, as being somewhat similar to the way we use the names of places to refer to villages, towns or localities we know. We can share maps efficiently without knowing how subjectively similar to our own our fellow travelers’ experiences of these places may be. In the case of the words we share, the degree to which we remain unclear about how precise the calibration of our own referential practices is in relation to the practices of other people is the degree to which the linguistic relativity principle operates within our own lives, and within a single language.

1. THE COGNITIVE CONSTRUCTS INVESTIGATION. This paper draws on data from an ongoing investigation into the way people talk (and think) about thinking in English, i.e. the cognitive constructs they use to make sense of their own and others’ inner lives (see Lee 2003 for more information about the project). The paper focuses on four locations in the landscape of mental activity, those designated by *analyze*,

contemplate, *brood* and *cherish*, and attempts to show how intercalibration of core meanings is adequate for general communicative purposes while idiolectal variation at the same time undermines any illusions we might have that we all use these words (or any others for that matter) in exactly the same way.

Data for Lee (2003) and this paper were drawn from 15 native speakers of Australian or British English. Interviewed separately, each was given a freshly shuffled pack of 106 small cards with mental predicates (see **Table 1**) written on them. The criterion used for including words in the set was that (in the opinion of the researcher) some element of intellection is involved in each of the named activities. Emblematic emotion verbs like love and hate were included in the hope that their nominal readings would be backgrounded in favor of verbal ones in the context of the research task, a vain hope in the case of many participants, as it turned out. Each person was asked to 'sort the cards and arrange them into any order that made sense' to them. As they worked, they were invited to talk about what they were doing using a 'think aloud' procedure supported as required by questions and encouragement from the researcher who also took notes about what was happening and audiotaped the activity. Participants were told that the words on the cards referred to 'things we can do', a somewhat problematic explanation perhaps in the case of mental state verbs, as discussed in Lee (2003), but not one which prevented most participants from engaging with the task in an active way. In an attempt to make the activity as open ended as possible, references to 'the mind', 'thinking', 'mental activity', etc., were avoided unless first made by the participant.

Participants varied considerably in the length of time they took to do the task (from about 20 minutes to well over an hour) and in the amount they were prepared to say. They also varied in the way they arranged the cards on the table in front of them. Some formed lists and/or clusters while others arranged them in piles. There was little discernable structure in some displays while in others an organizational logic was more evident. Some participants were able to generalize across their display, providing coherent accounts of their reasoning; others had little or nothing to say in this regard. Headwords were used by a few participants, either with or without comment.

The completed displays were photographed and the photos and transcripts of think aloud commentaries analyzed: a) to determine the extent to which the structure of D'Andrade's (1995) 'Folk model of the mind' could be discerned in the displays and in what was said, and b) to identify any other patterns of response or physical arrangement of the words that might invite further exploration with the goal of finding out more about what people think about thinking.

In most cases, the card sorting activity was successful in prompting metalinguistic commentary that, in turn, often involved metacognitive reflection of the kind sought. The main general finding, as reported in Lee (2003), was a tendency of most participants to differentiate, to some degree at least, between 'feeling' and 'thinking' or between 'emotions' and 'thoughts'. In doing so, they seemed to confirm the psychological reality of two of D'Andrade's five 'folk' categories, his 'Feelings/emotions' and 'Thoughts' categories. Two of his other categories, 'Wishes' and 'Intentions', were also

admire	agree	analyze	anticipate
appreciate	apprehend	approve	aspire
assess	attend to	believe	brood
calculate	cherish	choose	clarify
cogitate	compare	conceive	conclude
condone	consider	construe	contemplate
contrast	covet	daydream	decide
deduce	design	desire	differentiate
disagree	disapprove	discover	discriminate
distinguish	doubt	dread	dream
esteem	estimate	evaluate	excogitate
expect	fancy	fantasize	fear
feel	find out	forgive	generalize
guess	hate	hope	identify
imagine	infer	intend	judge
know	learn	long (for)	love
make sure	meditate	misconstrue	misunderstand
muse	note	notice	panic
perceive	plan	ponder	prefer
realize	reason	recall	recollect
reflect	regret	reject	remember
resent	resolve	respect	review
ruminate	speculate	suppose	surmise
suspect	sympathize	synthesize	take into account
think	understand	value	want
weigh up	wish	wonder	work out
worry	yearn		

Table 1. Mental predicates used in the cognitive constructs study.

evident to some degree in a number of the displays although groupings of these kinds rarely had the internal cohesion or central placement often seen with the two primary categories. D'Andrade's 'Perceptions' category was barely represented in the set as a whole and is therefore discounted here. The lack of salience of the other two minor categories was interesting, however, given that there is no indication in D'Andrade (1995) that his five categories might be unequally weighted in the overall economy of concepts about mental behavior, insofar as those concepts are represented by the lexical resources of English.

Three broad trends in addition to the thoughts/feeling bifurcation were also observed. The most noticeable was a tendency on the part of many participants to introduce a negative/positive polarity into their displays. This was indexed in their think aloud commentary by emotional evaluation of particular words, especially negatively toned ones like *panic*, *reject*, *resent*, *suspect*, *dread* and *hate*. The salience

of the negative/positive polarity seemed as important for some participants as the thoughts/emotion bifurcation for others; in some displays both dimensions of organization were evident. A second trend of interest was the vagueness of emotion or feeling category boundaries in many cases. These broad categories often included desideratives, intentions, and even contemplative thought. Finally, a tendency to differentiate between analytical and contemplative sub categories of 'thoughts' was evident in several displays.

The choice of *analyze* and *contemplate* as two of the focus words for this paper is an attempt to explore this contrast further. *Brood* and *cherish* were selected as middle of the road representatives of negative and positive emotion categories respectively and also because they did not have the nominal/verbal ambivalence mentioned above nor the emblematic status and intensity of emotion of paradigmatic emotion verbs such as *love*, *fear*, *hate*, etc. The purpose of the discussion below is not to provide a definitive analysis of the motivations of all participants in so far as these might have been inferred from the structure of categories they set up or their comments about those categories or about particular words. On the contrary, the selection of examples of categories created by a few participants is unashamedly purposive in this paper. Only the most tentative generalizations are made across the data as a whole with regard to the placement of the four words; the fundamentally exploratory nature of the investigation is acknowledged and its limitations accepted. The purpose of drawing on the data from the constructs study is simply to show similarities and differences in category formation in the displays of a few participants as a basis for exploring notions of calibration of agreement and linguistic relativity in the context of linguistic resources available to speakers of English for talking about mental behavior.

2. FOUR 'LOCATIONS' IN THE COGNITIVE DOMAIN.

2.1. *ANALYZE*. When displays were examined, *analyze*, not surprisingly, was found in Thoughts categories where these were evident. For instance, in **Table 2**, the first three columns provide examples of clear cut categories of this kind. Although they are loosely similar in structure, having only *deduce*, *assess* and *learn* in common in addition to *analyze* itself, *compare*, *make sure*, *calculate*, *weigh up*, *find out* and *evaluate* are shared by two of the three. By contrast, the internal structure of the fourth column is less immediately evident. The group includes *worry* (more usually located with other negatively and emotionally toned words) and *muse* and *reflect*, which other participants tended to place in categories associated with contemplative thought, as we will see in more detail below. Only *differentiate* and *estimate* are shared with any of the other three groupings and with only one in each case.

When participants commented on categories that included *analyze* (either as they built up their displays or when they had completed them) they variously referred to the words in these groups as 'voluntary', 'conscious' or 'concrete', 'solid kinds of things', 'clinical', 'technical', 'process', 'researchy type of things', involved in 'the process of decision making', 'the figure out group' and things that were definitely 'to do'. (This last in

generalize	contrast	<i>analyze</i>	differentiate
compare	evaluate	reason	decide
learn	deduce	discover	muse
deduce	differentiate	find out	<i>analyze</i>
clarify	take into account	identify	worry
guess	<i>analyze</i>	learn	reflect
weigh up	compare	distinguish	estimate
consider	discriminate	calculate	
assess	estimate	plan	
<i>analyze</i>	calculate	design	
make sure	construe	deduce	
	attend to	evaluate	
	assess	assess	
	recollect	cogitate	
	weigh up		
	make sure		
	find out		
	learn		

Table 2. Some examples of categories that included *analyze*.

confirmation of the idea that only *some* of the items in the pack of cards as a whole could be regarded as things one could ‘do’).

A syntagmatic principle seems to be discernable in the organizational logic of all four examples in **Table 2** in that the various activities denoted may be coherently conceived as taking place sequentially or in complementary clusters in the course of a larger activity like problem solving. Alternatively, in the first three columns, a paradigmatic motivation might be inferred in the selection of terms that is lacking in column four where whatever subliminal (or liminal) narrative functioned as a combinatorial principle reaches out into rather more diverse domains of mental experience than in the other three cases. It is, of course, possible that the fourth grouping is a random juxtaposition of words—something that in the context of the open endedness of the research task must not be discounted. If it is not, a most tentative, albeit productive, procedure would be to consider these physical displays of categories that happened to include *analyze* as perhaps reflecting something of the internal networks of sense relations that formed parts of participants’ personal internalized linguistic systems. If such an assumption is at all warranted what is implied is a relatively high potential for ‘agreement’ in the sense of mutual intercalibration of meanings among three of the participants represented in **Table 2**, with the fourth somewhat out of tune in this regard. What this might mean in terms of referring practices is tentatively explored in sections 4 and 5 below.

ponder	fantasize	<i>contemplate</i>	reflect	reflect
<i>contemplate</i>	ruminate	think	<i>contemplate</i>	desire
muse	feel	speculate	recall	wish
imagine	love	notice	recollect	hope
reflect	imagine	take into account	ruminate	believe
ruminate	wonder	compare	remember	yearn
	covet	contrast	cogitate	wonder
	cherish	consider	reason	dream
	<i>contemplate</i>	suppose	ponder	love
	long for	conceive	consider	long for
		muse	muse	muse
		ponder		<i>contemplate</i>
		wonder		
		work out		
		weigh up		

Table 3. Some examples of categories that included *contemplate*.

2.2. *CONTEMPLATE*. As indicated above, *contemplate* was rarely located in the same group as *analyze*, being placed more often with emotion words and desideratives and more or less synonymously with *muse*, *reflect*, *ponder* and *ruminate*, as in the examples in **Table 3**. While no word other than *contemplate* occurs in all five, *muse* is found in four, *ruminate*, *reflect* and *ponder* in three and *imagine*, *wonder*, *love*, *long for* and *consider* in two. Again, it is tempting to take this level of congruency as suggesting something of the nature of the semantic core of the category for this group of participants. Compared with categories that included *analyze*, relatively little was said about categories in which *contemplate* was found, although two participants explicitly identified such categories as including ‘the arty ones’ and ‘neutral emotional type verbs’ respectively.

It is interesting to find *think* placed directly below *contemplate* in the third column in **Table 3**. *Think*, as explained in Lee (2003) was sometimes difficult for participants to place in their arrays. In two cases it was explicitly given superordinate status over an entire display; in some cases it was simply ignored. Synonymy seems to be the primary organizational principle in the first column in **Table 3**, a strong desiderative element seems to motivate the structure of the fifth and, to a lesser degree, the second, while the inclusion of *recall*, *recollect* and *remember* in the fourth gives that set a distinctively different connotational aura from the others in spite of the features they share.

Once again, we cannot read too much into these examples. Firstly, only five have been selected from a total of fifteen displays. Secondly, the nature of the task was such that structural motivations for individual displays had, of necessity, to be idiosyncratic—all that participants had in common were the cards themselves and a set of deliberately unspecific instructions; they were not asked to demonstrate *use* of the words in communication but simply to ‘organize’ the cards in some way that ‘made

hate	reject	hate	regret	<i>brood</i>
regret	hate	disapprove	misunderstand	reflect
suspect	resent	resent	resent	meditate
resent	disapprove	regret	covet	contemplate
judge	panic	dread	condone	daydream
misconstrue	<i>brood</i>	doubt	disapprove	worry
<i>brood</i>	fear	<i>brood</i>	dread	dream
misunderstand	dread		<i>brood</i>	ponder
covet			hate	ruminate
fear			panic	muse
panic			fear	
worry			suspect	
dread			doubt	
disapprove			worry	
reject			reject	
doubt				
disagree				

Table 4. Some examples of categories that included *brood*.

sense' to them personally. In the context of the task, whatever stream of consciousness effects were most active for individuals on the day had free reign to participate in the associative judgements they made. Nevertheless, if we again (adventurously) take these five examples as suggesting something about internalized semantic fields in the case of each participant, coherent sets of sense relations in which *contemplate* is a constituent do seem to be evident in each case in a context where the overall structure of each category is only approximately congruent and where variations give each category a subtly different character. To what degree such variations might undermine participants' capacity to use *contemplate* (or any other word in **Table 3**) with maximal efficiency for referential purposes would no doubt depend significantly on situational, including antecedent, circumstances.

2.3. *BROOD*. *Brood* was one of relatively few words that were uttered by some participants with emotional force that contrasted with the way they read out or commented on other words. For instance, it was said more softly, more emphatically, with drawn out pronunciation, or accompanied by sighs by different participants. It was explicitly referred to as 'negative' or 'bad' by two people and was generally placed with negative emotion words, as in the first four examples shown in **Table 4**. A few participants even turned their bodies away from such negatively toned categories, orienting themselves primarily to other parts of their display as they worked and thus, it seemed, revealing something of the way mental systems of understanding and knowledge may have reflexes in behaviors that would normally be regarded as non-cognitive in character.

The fifth column in **Table 4** shows *brood* located in a basically contemplative category of the kind we saw in the previous table. Its association with *worry* here is the only mild indication of a possibility for negative force in its semantic makeup. Again, this placement might have been accidental, resulting perhaps from a lapse of concentration or even from lack of familiarity with the word. Accumulating anecdotal evidence since the constructs project started suggests that *brood* may be relatively unfamiliar to many speakers, especially those who use English as an additional or alternative language. Nevertheless, the fifth grouping does have the same kind of internal coherence seen in the other *contemplate* categories. What seems to be suggested in this case is that only the core meaning of *brood*, as denoting a sustained inwardly focused mental activity, is primary for this participant; the unhappy or obsessive characteristics of brooding being either backgrounded or unknown. Either way, if the placement of the card reflects a stable configuration of semantic associations for this participant, a potential for miscommunication with the other four participants at a subtle level in regard to the use of *brood* is implied.

My dictionary (Collins Australian) provides the relevant definition of *brood* as 'to ponder morbidly or persistently'. This seems to be in harmony with the first four examples in **Table 4**, although the degree of intensity conveyed by the inclusion also of *hate* in each is perhaps not conveyed. By contrast, the first definition of *broody* in my dictionary: 'moody, meditative, introspective' seems to sanction the grouping in column five, perhaps via a kind of back formation process for this speaker. The second entry specifies: '(of poultry) wishing to sit on or hatch eggs'. For me at least, there is a reflex to brood here, too, although I am finding that few urbanites these days share the flock of connotations that I and contemporaries who grew up intimately acquainted with the behaviour of broody 'chooks' ('*Informal, chiefly Aust. and N.Z. a hen or chicken*') have. 'Wishing to sit on' etc. conveys nothing of the fluffed up, intensely preoccupied, stubborn irritability of such creatures or their determination to remain absolutely withdrawn from the world of daily intercourse even after the real eggs have been replaced by ceramic ones that will never hatch. Thus is the goal of precise intercalibration of agreement further frustrated for some of us by deepening rural/urban and generational divides as the years pass.

2.4. *CHERISH*. **Table 5** presents four groupings that included *cherish*, the fourth of our focus words. Categories such as these were variously described as: 'emotional verbs', 'emotional sort of feelings', 'positive type emotions', 'more like dreams', 'subconscious things' and 'things that just happen', thus contrasting their nonvolitional character with analytical thought categories in particular, these being given volitional status by some participants and described as 'concrete', 'solid', etc., as we saw above. In addition to *cherish*, each of the examples in **Table 5** also includes *appreciate*, *respect* and *admire* and, rather interestingly perhaps, either *forgive* or *condone*. By association with these words, the sentiment of cherishing seems to be directed primarily at other persons although the sense of clinging fondly to a hope or idea seems supported by the presence of desideratives (*want*, *long for*, *desire*, *yearn*, *covet*, *hope*, *aspire*), along with

sympathize	love	admire	admire
wonder	condone	approve	appreciate
want	admire	appreciate	respect
fantasize	approve	respect	hope
dream	respect	covet	<i>cherish</i>
<i>cherish</i>	appreciate	hope	forgive
admire	fancy	dread	agree
respect	<i>cherish</i>	forgive	believe
forgive	aspire	reject	esteem
appreciate	covet	regret	love
anticipate	esteem	<i>cherish</i>	meditate
fancy	value	fear	
long for		desire	
wish		panic	
desire		yearn	
yearn		hate	
aspire		love	

Table 5. Some examples of groupings that included *cherish*.

terms like *dream* and *fantasize* in column one which might relate to the cherishing of either persons or intangibles.

Column three in **Table 5** is interesting for its inclusion of negative as well as positive emotion words. The placement of *cherish* here seems suggestive if it is at all motivated by direct associations with adjacent words. Tempting though such flights of fancy might be, it is important to consider again that the grouping may have been accidental. The participant might, for instance, have made a general pile for ‘emotion words’ as they came up randomly in the pack and then laid them out in list form at the end for the camera, as happened in several cases. Even so, the structural logic of this category is evidently drawn from higher in a hierarchy of categories (‘emotions’ as against ‘positive emotions’) than the other three examples.

Although the examples of categories involving *analyze*, *contemplate*, *brood*, and *cherish* discussed above seem to reveal something about conceptual organization, it is important to stress the danger of reading too much into them. Only a few of the more interesting cases have been selected for discussion and no theory has been advanced to explain any relationships that might exist between words written on cards and manipulated by people in the context of an experimental task and any actual internal activity going on in those person’s brains. Nevertheless, that activity, by its very nature, cannot be directly observed, even through introspection, and previous empirical procedures for eliciting information about actual semantic structure have been a good deal more directive (and often totally subjective) than procedures used in the current investigation. The examples explored above have heuristic value at any rate, sufficient to give us a setting in which to pursue the issue of how linguistic relativity

might operate in relation to the egoic domain of experience. The next section offers a brief review of Whorf's reasoning in relation to his 'linguistic relativity principle' while in the following section I will attempt an exploration of the notion of 'calibration of agreement' from a usage based and connectionist perspective on language before attempting, in the final section, to explain how a linguistic relativity effect can take place within a single language in Whorf's terms.

3. THE LINGUISTIC RELATIVITY PRINCIPLE. The linguistic relativity principle, according to Whorf (1940b, 1940c; see also Lee 1996, 2000), operates in the nexus formed by human perceptual processes, the impinging world as apprehended by those processes, and the interpretive processes applied by the cognizing subject to make sense of the information provided by the senses. The first two elements of the equation are universal in species terms and essentially invariant; the third is specific and variable because of the role played by languages (and other culturally specific or personal factors) in the development and restructuring of cognition during the process of linguistic enculturation (see for instance Gopnik 2001, Slobin 1996).

When I argue that linguistic relativity effects can be found in the use of a single language, I do so not only because alternative construals of experience can be mediated by alternative grammatical constructions as demonstrated, for instance, by Kay (1996), who argued for an intra-speaker effect in this case, but also because the potential for linguistic relativity effects is nascent in the very process by which systems of knowledge, understanding and reasoning are built up over time in individual brains. To appreciate how this might be the case it is useful to first consider the notion of intercalibration of agreement from language use and connectionist perspectives.

4. LANGUAGE USE AND CONNECTIONIST PERSPECTIVES ON INTER-CALIBRATION OF AGREEMENT. As Chafe (1998: 97) reminds us: 'It helps us to think of casual conversation as a way separate minds are connected into networks of other minds.' Although skill to participate in other kinds of linguistic interaction may come less naturally during one's lifetime than ability to talk casually, Chafe's point applies to all forms of talk and writing in all situations of use. Indeed, the use of shared language resources is the primary means by which coordination of human attention and action is achieved, as Bloomfield (1987 [1930]: 152) noted when he explained that: 'By their common habits of speech, the individuals of a human speech-community influence each other and work together with an accuracy of adjustment that makes of the speech-community something like a single, super-biological organism.' Elaborating on this idea, Bloomfield (1933) made sound waves the mechanism for human cooperation without (in keeping with the prejudices of his time) speculating about how this might be accomplished in cognitive or neurological terms.

We are bolder today, of course. The notion that an internalized linguistic system underlies and produces (while at the same time being constituted by) those 'habits of speech' is fundamental to our conceptions about how language works. Theoretical speculation about the neurological functioning of that system (e.g. Lamb 1999)

or its characteristics in terms of conceptual organization (e.g. Langacker 2000) preoccupies many linguists, including myself, as we try to conceptualize what kind of phenomena would need to subsume the linguistic behavior we observe others and ourselves producing and processing. As Hockett (1987: 157–58, note 104) emphasized, taking issue with Saussure, a linguistic ‘system’ in this sense ‘exists ONLY in individuals’. He explained that what we call a ‘social system’ implies ‘a somewhat different use of the word: there are a great many agreements or parallels among the systems of the participating individuals (whose usages... are constantly being intercalibrated); by virtue of these parallels the participants can ordinarily manage to understand one another; and although the whole set of parallels is only roughly defined, it can validly be called a “system” in this slightly different but related sense of the word’.

What is the nature of the parallels Hockett refers to? The use of language depends on the generally unexamined assumption that others within our speech community will have acquired a range of sharable linguistic items and patterns similar to our own and that they will deploy these resources in contexts of use to index elements of their experiential history (including vicarious experiences) and aspects of the communicative situation in much the same way that we do. From a connectionist perspective (for convenience, I will refer to all theories of the system as a network involving distributed organization of information and parallel processing as ‘connectionist’) the linguistic items that manifest in situations of use, for instance as words or, more broadly, ‘idioms’ in Hockett’s (1987) sense, are momentary projections (crystallizations, coalescences, condensations, precipitations—choose your metaphor) generated as a function of the patterning of the internalized linguistic system (Lee 1996). Whether introspectively observable in forms recognizable as unspoken words or even (where the linguistic screen is transparent) as ideas, or whether they appear as events audible or visible to others as well as ourselves, the concreteness of such temporary events is an illusion, created partly by the way we name them with nominal rather than verbal forms.

In this context, given that the nature of the activity relating to their potential for projection into objectivity is distributed through the network as a whole, I do not find it particularly helpful to think of such events or entities as being located at nodes in networks even where additional explanation clarifies that this is just a manner of speaking. A more useful terminology, in my opinion, can be drawn from Bohm’s (1980) holographic theory. In this way of thinking and talking, the apparent entities or events are regarded as ‘enfolded’ in the manifold of interconnections that constitute the system when they are not active. In this state they return to an ‘implicate’ or ‘unmanifest’ order of existence where their identity dissolves into a state of potentiality until the next occasion of use when something resembling the last occasion of use ‘unfolds’ into the ‘explicate’ order again. The fact that no ‘recurrence’ is exactly the same as any former occurrence is fundamental to the functioning of the system conceived in connectionist or holographic terms. It is also crucially important for understanding the basis for idiolectal shifts over time and provides insights into

intercalibration processes. (See Lee 1996 for fuller discussion of the internalized linguistic system in holographic terms and Hockett's 1987 resonance theory).

Even when written, words are only apparently rendered concrete, for without readers who can recognize in the written patterns events similar to events in their own linguistic experience, the patterns on the page are only potentially linguistic and meaningful. In the moment of reading they come alive, not on the page but as events in the reader's brain. These in turn trigger spreading activation that, if the writer's intentions are honored in the event, echo patterns of activation in the writer's brain at the point where the words were originally precipitated onto the page. The agreements and parallels that Hockett refers to are those of activation patterns in the first instance and the intercalibration or coordination of individual linguistic systems is a matter of pattern matching at the neurological level, insofar as such patterns can be matched at all in separate brains. Such matching can only ever be approximate because the socialization and experiential histories that created each internalized system must vary from person to person, even those brought up in very similar environments. Approximate or not, it is this matching which enables separate minds to be connected into networks of other minds in the way Chafe describes.

It is also the means by which reference is accomplished. If I tell someone that I tried to analyze something, that I was engaged in contemplation, that I had been brooding over something, or that I cherished someone or something, each intentional predicate as it manifests as an auditory (or visual) event triggers patterns of activation in my addressee's brain that, if my attempt to refer is to be successful, must be at least roughly similar to mine. In particular, the default pattern of activation (that which is minimally governed by context of use and maximally determined by the denotative core of the term) needs to be coordinated to an important degree. Of course it is also helpful if activation associated with the connotational values of each word is similarly configured for each person as well.

Is reference, then, accomplished purely in the coordination of activation patterns? Essentially, yes. But the nature of the referring act and its success or otherwise in communicative contexts is more fully understood if we first return to the heuristics provided by Whorf's linguistic relativity principle and consider in more detail what it is that is calibrated in the course of linguistic enculturation, what is involved in the building up of personal (idiolectal) systems of linguistically conditioned understanding, and what is involved in referring to elements of experience. We can begin to do this by reference to the examples explored in section 2 above.

5. LANDSCAPES OF MENTAL ACTIVITY. As suggested above and discussed in detail elsewhere (Lee 1996 and 2000 in particular), Whorf's linguistic relativity heuristics assumes a realist stance on the world beyond the senses, i.e. that it exists in the same form for everyone, and that it interfaces with perceptual organs which operate in essentially the same way for everyone. At what the Gestaltists called the 'molecular' level, the products of that interface must therefore be commensurate for individuals, regardless of culture or language or idiosyncratic habits of attending to or ignoring

sensory data developed on the basis of nonlinguistic and noncultural experiences during one's lifetime. It is at the subjective or molar level, the level at which we make sense of the flux of experiential data, that variability of a substantive kind comes into the story. It is also at this level that systems of knowledge and understanding are built up on the basis of extrapolations from experience. These, by processes of accretion and sedimentation, build patterns of connection and activation over time in our central nervous systems. These patterns, in turn, organize memories for specific events that consolidate over time as schematic generalizations over similar events. The specific memories, the schematic attentional frames, and the products of the interactions of these two, can be triggered into the explicate order where they are available to consciousness or, alternatively, they may remain enfolded in the implicate order out of awareness. That state of potentiality is nevertheless sufficiently potent to sustain reflexes throughout the system in varying degrees of activation at all times.

Thus, if everything is connected to everything mentally, and each person's internalized system for making sense of the world is configured idiosyncratically on the basis of input factors that include exposure to specific kinds of experience, information about other people's experiences, personal imaginative elaborations on experience and knowledge, and factors implicit in genetic inheritance, then each person's understanding of events is relative to their own internal network and different from other people's to the degree that their internal systems are different.

This relativity of understanding and interpretation applies to the deployment of words themselves in thought and speech. Each recurrence of a meaningful linguistic event, e.g. a word like *analyze*, *contemplate*, *brood* or *cherish*, make its impress on the system as a function of the context in which it is heard, read, or generated privately in thought. In external terms, any evidence of associated emotions observed in the person alluded to or values expressed by speakers, writers, or bystanders in communicative contexts is also registered. Any behavioral concomitants of the mental event as picked out from the environment or referred to by others are also included as input into the system. Examples might perhaps include a concentrated downwardly directed frown in the case of *analyze*, together with outputs from the analytical activity e.g. separation of parts and elucidation of their relationships with each other. A calm outward gaze might be associated with the use of the word *contemplate*, a dark mood or irritable, self-preoccupied behavior with *brood*, and a smile in the case of *cherish*.

As the system (and I am taking the linguistic system to be inextricably embedded in larger systems of knowledge and understanding) accommodates each new deposition, its overall configurational contours shift. Existent pressures or tensions from within the system itself exert their influences as well, interacting with forces from outside or working on their own during episodes of silent thought. This happens whether or not linguistic elements themselves unfold in recognizable form. Even in enfolded and semi enfolded states, the influence of elements of experience we recognize as language when they do appear in the explicate order persists as a linguistic influence that is pervasive in recollection, understanding, and interpretation, as Whorf (1936: 67–68) eloquently explained.

In the case of intentional predicates, the internal 'feel' of activities we come to be able to designate by the various terms made available to us in the course of linguistic enculturation is also registered, but we have no way of knowing how close that feel in each case might be to what someone else feels when they label activities experienced in their own egoic domains of experience with the words we share. The degree to which the feel I commonly associate with, e.g. brooding or contemplating, is different from what you feel or remember feeling is the degree to which there is potential for a linguistic relativity effect to undermine communicative efficiency (in very subtle ways admittedly) between us. Similarly, the degree to which all the numerous occasions of use of the words have built up different contours of connotational salience for each of us offers further opportunities for linguistic relativity to operate when we communicate.

Reference is an approximate thing however we look at it, utterly dependent on mutual calibration between individuals of systems of understanding and knowledge that are infiltrated in every dimension by the systems that enable linguistic reference to occur. Each language, according to the nature of the resources it builds up over generations, provides its speakers with sets of resources for delineating and referring to egoic events and their external manifestations and effects. Within each language, speakers build up their own internal referential landscapes in the course of acquiring those resources, learning to deploy them as frameworks for thinking about internal behavior, and using them to coordinate others' attention to such behavior in daily life.

It is as if we all used maps by different publishers with different dominant interests and stylistic techniques although all have agreed to comply with a shared code specifying core principles. Actually, each such map is a map of a unique experiential and epistemic landscape. And yet each one of these personal landscapes has as its substrate the same primordial forces. It is this substrate that makes communication across cultures about mental events possible. Within our own speech community, our shared language resources ensure that we are able to direct others to locations in their personal landscapes that approximate locations we ourselves have in mind. We can do this with a much higher degree of success than is generally possible cross-linguistically. But our very success obscures from us the degree to which subtle miscommunications are still possible as we interact. The degree to which they occur is the degree to which we are alone in our own referential worlds, both inside and outside the egoic domain of experience.

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ECOLOGICAL VALIDITY, LEXICAL DECISION, AND LEXICAL PROCESSING

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OVER THE PAST COUPLE OF DECADES, a great deal of research has investigated the manner in which words are represented in the mind and how they are accessed. The primary appeal of this branch of psycholinguistics is that it seeks not only to provide insight into lexical representation and processing, but also insights into the fundamental characteristics of human mental architecture. Yet, the research enterprise seems to be characterized by a troublesome paradox: Although it seeks to uncover important generalizations concerning the nature of language and mind, the methods that it employs typically involve single-word processing in the visual modality under highly artificial conditions that do not appear generalizable to the conditions of normal language processing.

Our goal in this paper is to explore this paradox by focusing on the question of whether the dominant experimental technique in the field, lexical decision, can indeed offer true generalizations concerning lexical representation and processing. We argue that this is fundamentally a question of ecological validity—the extent to which an investigation captures a phenomenon as it naturally occurs. Strictly speaking, the lexical decision paradigm does not meet this criterion. It typically involves the presentation of words and non-words in isolation on a computer screen under conditions in which the participant is not engaged in communicative activity, but rather is required to judge whether stimuli presented on the computer screen are, in fact, real words of the language. Although lexical decision is clearly not an example of normal language use, we present evidence that it might nevertheless meet the criteria of ecological validity because, although it tests language under artificial conditions, it also generates knowledge that has consequences for language processing under multiple situations.

The evidence that we present in support of this view comes from a comparison of data obtained using a classic lexical decision paradigm with data obtained from a new experimental paradigm that we have developed. Crucially, in this paradigm, target words are not presented in isolation, but are rather embedded in connected text under conditions in which the participant is instructed to read for story comprehension. Our initial results suggest a strong correspondence between the lexical processing of words in isolation and words in a story context. They also suggest that the new research paradigm may open up new lines of investigation, which we discuss at the conclusion of this paper.

1. **VALIDITY AS THE EVALUATION METRIC OF SCIENCE.** All investigators who employ an experimental approach to the investigation of language are aware that the adequacy of their research can be assessed under the general headings of reliability and validity. Of these two, the assessment of reliability is by far the more straight-forward. Whether an experiment produces reliable results can be investigated directly through replication studies or, more commonly, indirectly by statistical means. The statistical analyses that are typically applied to psycholinguistic research have as their goal the determination of whether the results obtained in a particular experiment would also be obtained under identical conditions with other participants sampled from the same population (the analysis by subjects, or F_1) and with other language stimuli drawn from the same population of items (the analysis by items, or F_2).

The assessment of validity, the extent to which an experiment tests what it actually claims to test, is considerably more complicated and less objective. It is probably for this reason that the concept of validity has been traditionally decomposed into a number of discrete, but interacting components. We briefly overview four of the most commonly discussed aspects of validity.

The first is *content validity*, the extent to which an experiment adequately samples the population(s) under investigation. In the case of human participants, this translates into the extent to which the people who participate in the experiment constitute a representative sample of the population to which the research is designed to generalize. In the case of language structures, the criterion of content validity is often difficult to meet. Most experiments seek to learn something about “words in the mind”, yet, the practical constraints of experimentation require that only one or two languages are tested and that, within those languages, control procedures often disallow representative sampling of words in the language as a whole.

Whether an experimental investigation meets the criteria of the second type of validity, *construct validity*, can be the most contentious and not surprisingly, the least objective. Construct validity refers to the extent to which research tests theoretical constructs that can be shown to be relevant by virtue of empirical evidence or explanatory power. In the domain of linguistic inquiry, where researchers are often very divided on whether any set of putative principles or constructs actually exist, it is rarely the case that the criteria of construct validity can be met to everyone’s satisfaction.

The third type of validity, *face validity*, is defined as the extent to which a study has the appearance of a true experiment. Although face validity has often been dismissed as a false criterion of validity, it can be a very powerful force in shaping how research disciplines emerge and develop along methodological lines. In a recent review of methodological trends in mental lexicon research, Libben and Jarema (2002) surveyed 58 studies of lexical representation and processing, and found that 43% of these investigations employed the lexical decision task. In all but one of these investigations, response latency was the variable measured. The clear dominance of this research paradigm in the field has had the effect of imbuing lexical decision experiments with the aura of methodological prototypicality within the psycholinguistic research community. As such, it is perhaps optimal to view face validity as a type of ‘cultural valid-

ity' i.e., validity that is both culturally defined and culture-specific. Within the culture of psycholinguistic investigation, lexical decision has become almost synonymous with lexical processing. But is this truly the case, or does it only appear to be so within the culture of a small research community? To address this question, we turn to the fourth and final type of validity which is at the core of our investigation.

1.1. ECOLOGICAL VALIDITY AND THE LEXICAL DECISION TASK. As noted above, the concept of ecological validity is tied to the concept of generalizability. An experiment is ecologically valid if it yields results that can be generalized to provide insight into phenomena as they occur in a natural (usually broader) environment. Thus, under this conceptualization, field research has intrinsic ecological validity, whereas laboratory psycholinguistic research most often needs to make the case for ecological validity. This, of course, is not unknown to experimentalists but is rather the result of a trade-off between the advantages of observation in a natural task setting and the advantages of control over tasks and stimuli.

In this trade-off, the lexical decision task certainly has substantial advantages in terms of control. It allows an experimenter to manipulate exactly what a participant will see, in what context, and for how long. For example, a researcher interested in whether the frequency of a particular word affects the ease (and therefore, speed) with which a word is recognized might select high and low frequency words for presentation, measuring the speed with which the 'yes' lexical decision response is made. Variations on this basic experimental design may involve manipulating the context of presentation so that stimulus words are preceded by related and unrelated stimuli (a primed vs. unprimed lexical decision task) to measure how words facilitate each other's recognition. Crucially, the primes in such an experiment can be presented for any duration, including very brief periods (e.g. 40 milliseconds), which are sufficient for recognition but too brief to be consciously perceived.

Finally, it should also be noted that in lexical decision tasks, both real words and non-words may constitute the critical stimuli. Thus, an experiment that targets the effects of phonotactic (or orthotactic) constraints in visual processing may manipulate the orthographic properties of non-words to investigate whether strings such as 'gloor', which correspond to phonotactically legal strings in English, are rejected more slowly than strings such as 'gmoor', because the latter are less word-like.

We have alluded to the view that the dominance of the lexical decision task in psycholinguistic research is partially due to social factors that favour methodological cohesion within a research community. This, however, cannot be the main reason for its dominance. Lexical decision also offers researchers some real methodological advantages. The first of these is ease of use. Lexical decision tasks are relatively easy to create and require minimal laboratory hardware beyond a desktop or laptop computer. Analysis is relatively simple, because responses are discrete ('yes' or 'no'). The measurement of response latency for each of these response types ensures a relatively sensitive dependent variable that is not subject to the floor or ceiling effects that often characterize accuracy measurements. Finally and most importantly, the lexical

decision paradigm is understood to provide a 'pure' measure of lexical recognition—one that simply measures how long it takes for a word to be initially accessed.

But the question remains: whatever its laboratory advantages, does this paradigm allow us to learn about lexical processing in general? In order to evaluate this question from the perspective of ecological validity, we might focus on two considerations. The first is the issue of experimental artifacts. If an experiment reveals a stable (i.e. reliable) pattern of behaviour that is, however, an artifact of isolated word processing, ecological validity is almost certainly compromised. On the other hand, if the results are not artifactual, we should not be led astray by the 'face validity of ecological validity'. Put another way, it is not necessarily the case that just because a lexical decision task does not have the appearance of ecological validity, it does not yield results that are in fact generalizable to more natural contexts.

2. ONCE UPON A LEXICAL DECISION TASK. Our goal in the research reported here was to investigate the issues of ecological validity discussed above through the creation of a new experimental paradigm that would have some, but not all, of the characteristics of the classical lexical decision task. More specifically, we asked the question: are lexical decision results artifacts of the manner in which lexical decision tasks are normally conducted, i.e. the presentation of words in isolation rather than in connected text. It is quite conceivable, for example, that effects such as lexical frequency, as discussed above, are only obtained because, when words are presented in isolation, only lexical variables get to play a role. What would happen, for example, if participants were attending to a story instead? Under such conditions, it is conceivable that the frequency effect would simply disappear, because participants could use top-down processing to predict which words would be presented next. The effect could also disappear because in such a 'natural' context, the processing emphasis is on properties of the story, not on properties of words within it.

We sought, therefore, to construct a lexical decision task in a story context and to arrange that experimental context so that participants were required to pay attention to properties of the story by, for example, answering comprehension questions throughout the experimental session. This goal, however, led to our greatest design challenge: by definition, lexical decision experiments require the presence of real words and non-words for choice tasks. What type of story could contain the required large number of non-words, without itself sacrificing ecological validity as a natural story? The selection of fairy tales as a literary genre seemed to offer us a solution to this problem. Fairy tales often involve fantastic settings with novel names for characters, objects, and places. Our approach to the paradigm design capitalized on this property by embedding both words and non-words at natural points within fairy tale constructed for this experimental purpose. This fairy tale is presented in the appendix, with target words (i.e., those used for lexical decision) shown in bold.

As explained below, the 750-word fairy tale contained 34 target real words and 35 target non-words. Approximately half of the real words were high frequency and half were low frequency. Of the 35 non-words, approximately half were orthographically

and phonologically legal and half contained pairs of consonants that violated the phonotactic and orthotactic constraints of English. Thus, taken together, the critical words in the fairy tale story allowed us to test for both a real-word frequency effect and a non-word phonotactic legality effect in lexical processing.

Our investigation of the frequency and legality effects proceeded in the following manner: we extracted the critical words in the fairy tale and presented them to participants in a classic lexical decision task, in which words are presented one at a time in the center of a computer screen. This investigation is reported in Section 3 below. Following this experiment, a second group of participants were presented with the same list of words, now embedded in the fairy tale. The story was presented in the center of the screen one word at a time, for a duration of one second per word. Participants were required to attend to the content of the story, but were also asked to judge the lexicality of target words (presented in red) as they appeared in the story. The results of this second experiment and their comparability to those of Experiment 1 are presented in Section 4 of this report.

2. EXPERIMENT 1: CLASSICAL LEXICAL DECISION. One of the most robust effects in lexical decision experiments is the frequency effect. The frequency of a word has been found to be perhaps the strongest determinant of the speed with which a word is recognized, with high frequency words having an advantage over low frequency words. The source of this effect has been characterized in a variety of architecturally distinct models. Forster (1976) captured the frequency effect within the context of a lexical search model in which words in the mental lexicon can be conceived as being represented in a frequency-ordered list. A strongly contrasting view was represented in Morton's logogen model (Morton 1969), in which high frequency words were seen to have low activation thresholds, so that they could be more easily activated than low frequency words under conditions of equal stimulation from the outside world. Currently, the logogen-type view of frequency can be said to dominate (with substantial refinements).

Another well-known effect in the lexical processing literature is that words that violate the phonotactic and orthotactic constraints of English (e.g. 'gmoor') are more easily rejected in lexical decision as compared with legal strings (e.g., 'gloor') that could conceivably represent real words (Libben 2000). The reason for this is likely related to depth of processing. Illegal non-words can be rejected out of hand, because they could not possibly exist in the language. In a Forster-like search model, legal words initiate an exhaustive search of the mental lexicon, resulting in long response latencies, because no corresponding entry is found in the participant's mental lexicon. Activation models can predict the same results, but through different means. In activation models, illegal non-words excite no similar representations in the mental lexicon, because, by definition, none exist. Legal words, on the other hand, have at least some orthographic neighbours, which are automatically activated and then deactivated, thus increasing the time required to make a 'no' lexical decision.

In the experiment detailed below, our goal was to replicate each of these effects in a classical lexical decision paradigm, so that the obtained results could be compared to those found using the fairy tale paradigm in the same laboratory, using the same experimental software, and with participants drawn from a single participant pool.

3.1. METHOD.

3.1.1 PARTICIPANTS. Twenty undergraduate students from the University of Alberta participated in this experiment. Participants were between the ages of 18 and 30, and all were native speakers of English. Each was paid ten dollars for his/her participation.

3.1.2. PROCEDURE. Participants were tested one at a time in psycholinguistic testing booths. The experiment was conducted on iMac G3 computers using Psyscope 1.2 experimental software. The experimental session was conducted in under ten minutes and consisted of three blocks. The first was an instruction block in which participants received standard lexical decision instructions, asking them to press the 'yes' key if the word presented on the screen was a real English word. If the presented string was not an English word, they were instructed to press the 'no' key. Participants were told that both accuracy and latency were being measured, so they should try to respond as quickly and as accurately as possible.

Following the instruction block, participants completed ten practice trials, and were then asked whether they were ready to proceed to the main part of the experiment. This main experimental block consisted of 80 trials in which 40 real words and 40 non-words were presented in random order. Each trial began with the presentation of a fixation point on the screen for 500 milliseconds, followed by the presentation of the stimulus string. The stimulus remained on the screen until the participant pressed either the 'yes' or 'no' key. The pressing of the response key initiated the onset of the next trial.

3.2. RESULTS AND CONCLUSIONS. Of the 40 real words and 40 non-words in the experiment, only those 69 critical stimuli from the fairy tale paradigm were analyzed. All responses that were greater than 1200 milliseconds (4% of the data) were removed from the data set.

Response latencies to words and non-words were analyzed in separate analyses of variance by participants, with word type as the repeated measure.

As can be seen in **Figure 1**, the expected frequency effects were obtained, such that participants responded 'yes' to high frequency words (mean frequency = 315 per million) significantly more quickly ($F(1,19) = 42.5, p < .0001$) than they responded to low frequency words (mean frequency = 3 per million). The results for legal and illegal non-words also corresponded to expectations. As can be seen in **Figure 1**, participants rejected legal non-words ($RT = 673$ ms) more slowly than they rejected illegal non-words ($RT = 595$ ms). This difference was statistically significant ($F(1,19) = 78.2, p < .0001$).

In summary, this initial classical lexical decision experiment found both significant frequency effects for real word stimuli as well as significant phonotactic legality

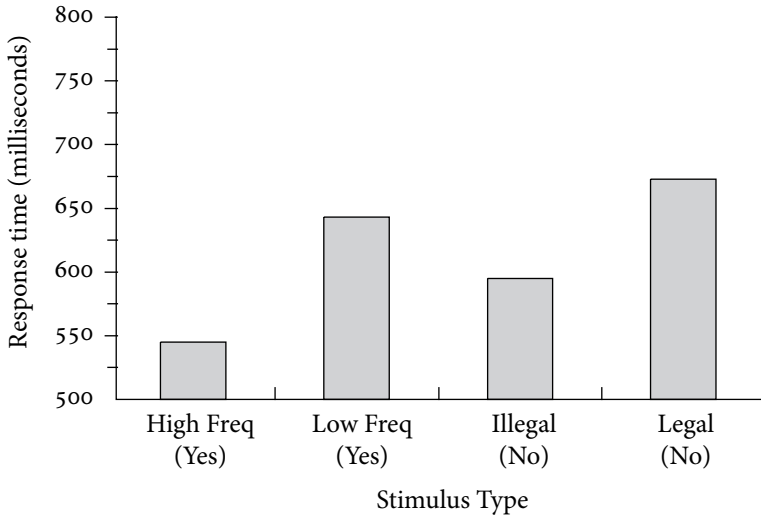


Figure 1. Response latencies to words and non-words in classical lexical decision.

effects for non-word stimuli. The next step in our investigation was to determine whether comparable effects would obtain under conditions in which words and non-words were presented in the context of a story. This second experiment is reported in Section 4 below.

4. EXPERIMENT 2: LEXICAL DECISION IN A FAIRY TALE CONTEXT.

4.1. METHOD.

4.1.1. PARTICIPANTS. The twenty participants in this experiment were drawn from the same participant pool as those who took part in Experiment 1. All were undergraduate students from the University of Alberta between the ages of 18 and 30, and all were native speakers of English. Each was paid ten dollars for his/her participation.

4.1.2. PROCEDURE. The stimuli that participants responded to in this experiment were identical to those used in Experiment 1. The difference between the two experiments lay in the context of presentation. In this experiment, participants were instructed that they would be presented with a story, one word at a time. They were asked to attend to the content of the story, as there would be three sets of comprehension questions presented at certain points during the experiment. They were also told that if a word of the story appeared in red print, they were to judge, as quickly and as accurately as possible, whether that word was an English word by pressing either the ‘yes’ or the ‘no’ response key.

The experiment required approximately thirty minutes to complete. Following the instruction block, participants were presented with a short practice story, which was followed by the main 750-word fairy tale. This fairy tale was presented in three blocks

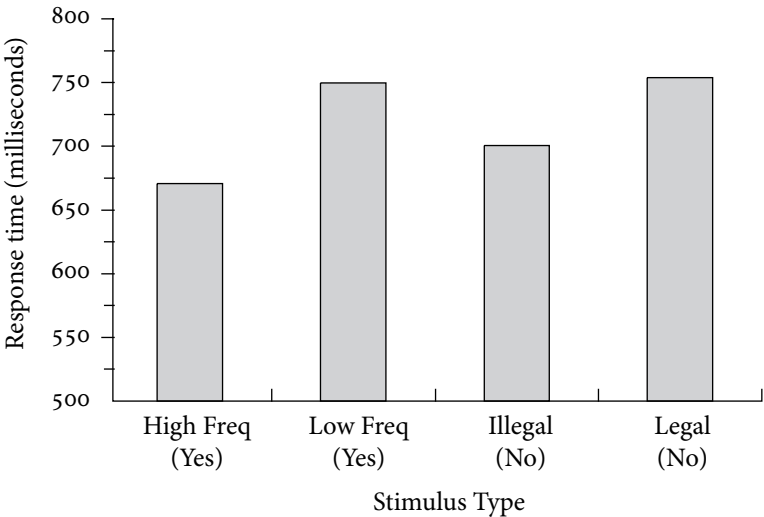


Figure 2. Response latencies to words and non-words in the fairy tale paradigm.

of approximately 250 words with five multiple choice comprehension questions at the end of each block. Within each story block, words appeared automatically on the screen at one second intervals.

4.2. RESULTS. As in Experiment 1, response latencies greater than 1200 milliseconds were removed from the data set, and latencies to words and non-words were analyzed in separate analyses of variance by subjects, with stimulus type as the repeated measure.

As can be seen in **Figure 2**, the pattern of results obtained in this experiment was almost identical to that obtained in Experiment 1. There was a significant frequency effect for real words ($F(1,19)=46.5, p<.001$), as well as a significant legality effect for non-words ($F(1,19)=66.7, p<.001$). Although the two experiments showed an extraordinarily similar data pattern, it should be noted that lexical decision latencies were, on average, about 100 milliseconds slower in the fairy tale paradigm. We interpret this result to represent the fact that in this paradigm, not every word required a response. Thus it is likely, that lexical decision latencies across all stimulus types are built upon a constant ‘response shift’ latency that requires approximately 100 milliseconds.

5. GENERAL DISCUSSION. We began this investigation by highlighting two key characteristics of research on lexical processing. The first is that is that investigations seek to gain insight into the fundamental characteristics of lexical processing and the organization of words in the mind. The second is that research in this field shows a dominant use of the lexical decision paradigm which, on the surface, is highly artificial. The question we sought to address was whether the effects obtained in lexical

decision paradigms artifacts of the presentation of words outside any textual context? In other words, do lexical decision tasks have the ecological validity that would be required for valid generalizations concerning human lexical processing?

We reported two experiments. The first employed a classical lexical decision task with high and low frequency words as well as legal and illegal non-words. The second experiment employed a new paradigm that we have developed. In this paradigm, the lexical decision task is embedded in a textual context, specifically a fairy tale. This text genre was selected because it licenses the presence of both words and non-words as part of the text.

Results from these two experiments were virtually identical, providing evidence that frequency and phonotactic legality effects are not artifacts of isolate word presentation out of context. In our view, this pattern of results across experiments has two important implications.

The first of these implications concerns the nature of lexical processing. We interpret the consistency of effects across text-independent and text-embedded contexts to reflect a computational encapsulation of lexical processing. Under this view, the properties of lexical processing that generate the frequency and legality effects that we found reflect automatic and obligatory processes of lexical access that are stable across contexts because they are encapsulated as subsystems within the overall cognitive system.

The second implication concerns the experimental opportunities that are created, if indeed lexical processing is identical in text-embedded and text-independent lexical decision. In our view, the fairy tale paradigm opens up opportunities to investigate lexical processing phenomena that have thus far been outside the scope of lexical decision research. For example, it has not been possible in the past to investigate whether frequency effects can be modulated by participants' perceptions of who is actually producing the words to be judged. In principle, it is possible that frequency thresholds would be altered if participants perceived the story producer to be a child rather than an adult, or a non-native speaker rather than a native speaker of the language. We are currently investigating these possibilities by extending the fairy tale paradigm to the next step of naturalness—one in which videos of speakers accompany the presentation of the story and the embedded lexical decision task. In this way, the new paradigm will allow us to investigate lexical processing not only in a text-embedded context, but also in a socially embedded one.

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APPENDIX: FAIRY TALE: THE PRINCESS AND THE PANDA

Once upon a time there lived a young princess named Wan. She loved **animals**. Her castle looked more like a zoo than a **gloor**. Everyday Wan would walk in the **forest** with her giant panda named Ralph. They would look at the **rwoos**, swim in the **lagoon** and feed the **birds**. One day, they stopped to eat a **bowl** of rice and **pekedom** at their favorite **tboldod**. They did not hear the evil **sorcerer** sneak up from behind. Now this sorcerer was part **man** and part **prass**. He had the head of a **homosapien** but his arms, legs and **prools** were very large and covered with **hair** and **kmouls**. He grabbed the panda with one of his **talons** and started to carry him away. He yelled **back** that he was going to hold Ralph **hostage**, and probably eat him, unless Wan brought him the eye of Hraw by **dusk**. Poor Wan! There was no way that she could climb Mount Doom and get the eye of Hraw in one **day**. She would have to go ask prince Twan for help. Wan did not like Twan at all. She thought that he was a **plogant** and a **snob**. But unfortunately, he was the only one who could help. An hour later, Wan was sitting in Twan's **banquet** hall explaining what had happened. When she was done, Twan **groosed** at her and said he never liked the stinky panda anyway. Wan was very mad, she grabbed a nearby **npob** and almost threw it at Twan's **head** before he said he was only joking and would help her find old stinky. Wan and Twan packed their **flom-dons** and went to the **dugout** where Twan kept his lwosarg. It had grown since the last time Wan had seen it. Its wings were as big as **julks** and its beak had become as sharp as a **tmoop**. It was a mean looking **thing** A few **bjoplons** later, they were flying over **glaciers**, coming close to Mount Doom. The eye of Hraw was protected by the scariest creature in the area, the giant ice **platypus**. Lucky for Wan and Twan, the platypus had become lazy and fat over the **years** because he only ate **gopls**. They landed the lwosarg on a bamboo **breeb** in front of the platypus's cave and crept in the **sgoib**. The cave stank of rotten **food** and **sloog**. The platypus was asleep on his back, snoring loudly, with the eye of Hraw placed on his **tummy**. Twan attached a hook to the eye of Hraw and lifted it off the platypus. The platypus grunted and his **fdeew** began to shake. Wan and Twan spun around and ran as fast as they could, tripping over **trouds** and **boutrs**. They jumped onto the lwosarg and could hear the platypus's **vorps** hitting the **ground** behind them. The lwosarg took off and they left the platypus stomping on the mountain **ledge**. The **sun** was starting to set and the lwosarg was flying quickly to the sorcerer's **house**. As they were flying, Wan offered Twan a bite of her **wbiot**. She was actually starting to like him. The sorcerer's house was next to a large **plut**. The lwosarg landed behind a **tree** and Wan and Twan walked slowly to the front door of the **ylop**. Wan could feel small **tremors** running through her hands as

she thought about the horrible things that the sorcerer might have done to her panda. They could hear noises and **blups** coming from inside the main **qyit** of the house. Wan lay down and peeked through the **hort** under the door. She could see the sorcerer and Ralph sitting on a **sedb** playing cards. What in the name of **ferd** is going on? she asked out loud. Twan was already banging on the side of the **brog**. The sorcerer opened the door Wan showed the eye of Hraw and demanded to have her panda back. said Wan. The sorcerer shook his **whiskers** and said that Ralph was his **dost** now. He did not want to be alone again. Wan's **mipn** turned **red** but Twan yelled: that if you have to kidnap your **friends** and hold them as **nopks**, they're not really your friends. Maybe if you asked Wan nicely she would let you come and visit Ralph at her **quarters**. Wan thought about it and then said she guessed it would be okay, as long as he didn't act like a **coutx**. Wan and Twan stayed and had dinner with the sorcerer.





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MAX MÜLLER'S REFUTATION OF DARWIN: A MISSING LINK IN THE DESCENT OF LINGUISTIC RELATIVITY FROM HUMBOLDT TO WHORF

Patricia Casey Sutcliffe
Colgate University

PERHAPS YOU RECALL a scene in *Through the Looking-Glass*, which was first published in 1872, in which Alice finds herself in the Wood with No Names. She and a fawn are walking together, trying to remember what they are called. Alice and the fawn experience a closeness that is destroyed as soon as they leave the wood and remember their names, likewise recalling that fawns are supposed to fear humans (Carroll 1996:155). This scene could be described as a very simple (indeed nonsensical) rendering of the idea of linguistic relativity often attributed to Benjamin Lee Whorf. Without *language*, in this case, nouns, Alice and the fawn do not know where they belong in the universe or what the relations between them should be. With the words, their coded relationship is reinstated, and their intimacy is lost.

Lewis Carroll's *Alice* books are very widely known. Less well known is that Friedrich Max Müller (1823–1900), a comparative philologist of German heritage and training, lived and worked at Oxford at the same time as Charles Dodgson, the Oxford logician behind the Carroll pseudonym. Müller¹ was a great popularizer of 'the science of language' (see below) and propounded a theory of language which included the idea of linguistic relativity as we understand the term today, as well as many other ideas which he borrowed and altered to some extent from his German teachers and predecessors, among them Wilhelm von Humboldt. It is probable that Müller influenced Dodgson, as his popular *Lectures on the Science of Language* were first delivered publicly at Oxford in 1861 and 1863 in two series, and first published in 1862 and 1865, respectively, roughly a decade before *Through the Looking-Glass*. But that is the topic of a different paper². The present paper investigates the extent to which Müller influenced Benjamin Lee Whorf in developing his theory of linguistic relativity and proposes to add modestly to the ongoing discussion of Humboldt's influence on Whorf by positing Müller as a key link in the line of descent of Humboldt's theory.

Rollins (1980:49–52) was the first to suggest that Müller influenced Whorf, and subsequent literature has, for the most part, reiterated his basic claim (Koerner 1990:120, Joseph 1996:390–91, Lee 1996:21). Yet as Lee (1996:21–22) notes, 'the degree of this influence has yet to be traced with any finesse'. Apparently, the topic has failed to seem worthy of investigation to others, and Rollins's treatment, a mere three pages, is too superficial to be definitive. Briefly, his argument can be summarized as follows: First, Rollins links Müller and Fabre d'Olivet as 'Theosophic opponents of sensationalism' (1980:49). He then points out the Kantian roots of Müller's theory, and he notes that for Müller 'language and thought were inextricably related' (ibid:50). Finally, he claims that Müller

attempts to justify Christian faith to a skeptical age in his Gifford Lectures, and that he does so largely using linguistics as a science that proves faith: 'linguistics might prove to be a science which would lead to what Müller called an experience of "intelligence and bliss"'. Thus, Müller (with Fabre d'Olivet) inspired Whorf to use linguistics to justify faith scientifically (ibid: 52). A number of these points are taken up in the following discussion, as they are worthy of further examination.

Lee (1996:14) makes a convincing case that Whorf has often been 'misread, unread, and superficially treated'³. The same can be said of Müller, and just as Lee argues that many of the false interpretations of Whorf are based on a 'dichotomized conception of language and thought' (ibid: 85), so are the false interpretations of Müller based on this dichotomy. When the parallels between Müller's and Whorf's theories are outlined below, the comparison should offer further support for Lee's analysis of Whorf's theory complex as an approach to language in which language and thought are inextricably intertwined and interdependent processes.

The question of influence is always a difficult one, because statements acknowledging direct influence are relatively rare, and a lot of influence functions unconsciously. Though Whorf does not overtly cite Müller as an influence, we can state with certainty that he read several of Müller's works, including *Chips from a German Workshop* (read 1925–26), *Science of Language*, and *Sanskrit Grammar* (both read 1926) as Whorf put them on his 'Library books read, beginning Jan. 1925' list (Joseph 1996:391). Also listed in 1926 is William Dwight Whitney's *Oriental and Linguistic Studies* (OLS). This is important and relevant here because OLS contains articles which are very critical of Müller's theory, just as Müller's *Chips* volume 4 contains articles criticizing Whitney and defending his own theory against Whitney's criticism. The fact that Müller's and Whitney's works refer to one another in the volumes mentioned and the chronology of Whorf's reading suggest that Whorf may have read OLS as a result of having found references to Whitney in *Chips* 4. Thus, this listing of books allows us to establish with some confidence that Whorf was familiar with the major strands of Müller's thought from an early stage in his intellectual development, and specifically, that he was familiar with the controversy between Müller and Whitney which was aired in articles reprinted in *Chips* 4 and OLS. This fact is significant, as the feud revolved around Müller's attack on Darwin's theory of evolution, the main arguments of which appear in altered form in Whorf's mature linguistic writings⁴.

A closer look at the Müller-Whitney controversy is warranted here in order to clarify just what Whorf read in *Chips* in 1925 because in that year, he, too, wrote a refutation of Darwin's theory of evolution entitled 'Why I Have Discarded Evolution', which was mailed to Thomas Morgan in late October, though it was never published (Rollins 1980:20). It seems that Whorf may have been inspired by Müller's arguments to attempt his own refutation.

The Müller-Whitney feud took place between 1874 and 1876. Müller's refutation of Darwinism was based on his identification of language and thought. The feud began when Whitney published an attack on Müller's refutation entitled 'On Darwinism and Language' in the *North American Review* in 1874 (Alter 1994:497). Then Whitney

approached Darwin in an effort to get these views published in England. This attempt failed. George Darwin, the son of Charles, wrote an article entitled 'Professor Whitney on the Origin of Language', wherein he described Whitney as 'the first philologist of note who has professedly taken on himself to combat the views of Professor Max Müller' (quoted in Müller 1890:420). George Darwin summarized Whitney's arguments in order to defend his father's theory (Sutcliffe 2001a:262). Several articles back and forth then ensued. These were eventually reprinted in Whitney's *OLS* and the fourth volume of Müller's *Chips*. Specifically, the final two articles of the fourth *Chips* volume contain Müller's reactions to Whitney's criticisms: 'My Reply to Mr. Darwin' (417–55) details G. Darwin's use of Whitney's arguments, and 'In Self-Defense: Present State of Scientific Studies' (456–532), despite its title, is actually a meticulous examination of Whitney's writings to reveal fundamental similarities between Müller and Whitney, particularly on the points that Whitney had argued were so different in the dispute over language and Darwinism. It is likely that Whorf read these two articles prior to writing his own refutation in 1925.

Müller's 'quarrel with Darwinism' (Knoll 1986) is also important to the present discussion because it is precisely in Müller's arguments against Darwinism that we can find the greatest number of parallels with Whorf's later linguistic theories. Significantly, these parallels do not appear in Whorf's own refutation for the most part, but rather, they come out in his mature linguistic writings. These parallels include, as I show below, an essentially Kantian conception of human understanding; the identification of language and thought, which correlates with the linguistic relativity principle; the fundamental linguisticity of man's existence; the reconciliation of science and faith by means of linguistic theory; and the relevance of linguistics to all human knowledge. Significantly, however, I do not believe there is a connection to the Theosophical Society, as Rollins maintains.

1. MÜLLER'S THEORY OF LANGUAGE AND HIS REFUTATION OF DARWINISM. First, we need to examine Rollins's claim that Müller was a Theosophist⁵. Whereas Whorf's connection to The Theosophical Society is clear (Lee 1996:21), Müller's is less so. According to the The Theosophical Society's homepage, it 'is a worldwide association dedicated to practical realization of the oneness of all life and to independent spiritual search... founded in New York City in 1875 by Helena P. Blavatsky, Henry S. Olcott, William Q. Judge, and others' (Theosophical Society 2003). The only evidence Rollins (1980:51) provides to substantiate his claim that Müller was a Theosophist is the fact that he published his Gifford Lectures in book form in 1893 'with a significant title, *Theosophy: or, Psychological Religion*'. Other writers who claim Müller was a Theosophist (or a theosophist) all ascribe this information to Rollins and accept it as truth (Lee 1996:21, Joseph 1996:390, Koerner 1990:120).

In point of fact, when we look at Müller's 'theosophical' book closely, it appears that he was actually not a Theosophist, that is, not in the sense associated with The Theosophical Society of Madame Blavatsky. He explains in the preface his reasons for

adding the term *theosophy* to the title of the book, which was not part of the title of his lectures:

It seemed to me that this venerable name [theosophy], so well known among early Christian thinkers, as expressing the highest conception of God within the reach of the human mind, has of late been so greatly misappropriated that it was high time to restore it to its proper function. (1893: xvi)

We must examine the historical context of Müller's words here to understand the full purport of his statement. As noted, The Theosophical Society was founded in 1875. In addition, Madame Blavatsky's *The Secret Doctrine*, today still a foundational work for The Theosophical Society, was published in 1888 and proved exceedingly popular. Müller thus would seem here to be eschewing the use of the term *theosophy* in this new movement, which was rapidly evolving and spreading at the time⁶.

Rollins (1980:50) is more correct in suggesting that Kant's *Critique of Pure Reason* was crucial to Müller's understanding of language. In fact, Müller's whole theory of language, as well as his refutation of Darwin's theory of evolution, was based upon a Kantian understanding of mind. This is evident in *The Science of Thought*, in which Müller (1887:127–51) spends an entire chapter explicating Kant's philosophy. Moreover, Müller translated Kant's *Kritik der reinen Vernunft* into English in 1881 because he felt that it was so fundamental to all knowledge, and yet underappreciated and underread in Great Britain (G. Müller 1902:107; Sutcliffe 2001a:80). Significantly, Müller also felt that Darwin would not have developed the theory of evolution if he had been familiar with Kant's philosophy of mind:

Such is my faith in Mr. Darwin's intellectual honesty that I should not have been surprised at his giving up his theory of the descent of man from... some kind of animal, if he had been acquainted with Kant's *Critique of Pure Reason*. (quoted in Knoll 1986:10)

According to Müller's interpretation of Kant, the world cannot be known or understood directly, but must always be filtered through *a priori* categories of understanding. In Rollins's words, Kant '[proved] the interpenetration of mind with reality' (1980:50). Although things in themselves exist (Kant's *Dinge an sich*), they are unknowable in their true state. Rather, the sensations caused by things in themselves must be perceived by the individual, thus becoming percepts, and the percepts in turn must be related to other percepts or to general categories of mind by the individual in order to be understood. Müller (1887:286) focuses on Kant's categories of space, time and causality. In the end, being related to other percepts or to these general categories, percepts become concepts. In consequence, percepts and concepts are inseparable, and being inseparable, they are identical in Müller's use of the term. As Müller (ibid:28, see also Sutcliffe 2001a:51) explains, the term *identity* refers to two things or processes that cannot exist independently of one another.

Müller extends Kant's categories of understanding to language, and in so doing, he asserts the identity of language and thought in the same way as he postulated the identity of percepts and concepts. As with Kant's other categories, Müller views language as a filter through which we see the world, and which we cannot escape. Thus, like Whorf, Müller propounds a theory of linguistic relativity: language influences the way in which we understand the world. In Müller's logic, just as percepts *become* concepts by being related to one another, concepts *become* terms in a language by being related to it, simultaneously becoming *identical* with those terms in the sense of being interdependent and inseparable from them. In other words, language and thought are *identical*⁷. Rollins (1980:50), as noted above, also remarks upon the inextricable relation between language and thought for Müller.

Müller's identification of language and thought then provided the foundation of his refutation of Darwin's theory of evolution as applied to mankind. If language and thought were identical, as he felt he had shown, then the one could not exist without the other. There is no language without the reasoning mind of man, nor is there man without language. Thus, man's nature is fundamentally linguistic: 'was den Menschen zu Menschen macht, ist die Sprache: wie schon Hobbes sagte, *homo animal rationale quia orationale*' (Müller 1872:27). Thus, the identification of language and thought precludes the possibility of the gradual development of language, which would require that man be able to reason before he could talk.

Where, then, is the difference between brute and man? What is it that man can do, and of which we find no signs, no rudiments, in the whole brute world? I answer without hesitation: the one great barrier between man and brute is *Language*. Man speaks, and no brute has ever uttered a word. Language is our Rubicon, and no brute will dare to cross it. This is our matter of fact answer to those who speak of development, who think they discover the rudiments at least of all human faculties in apes, and who would fain keep open the possibility that man is only a more favored beast, the triumphant conqueror in the primeval struggle for life. Language is something more palpable than a fold of the brain, or an angle of the skull. It admits of no cavilling, and *no process of natural selection will ever distill significant words out of the notes of birds or the cries of beasts*. (Müller 1862:354, emphasis added)⁸

Again, Kant's theory of human understanding provided the justification for Müller's view of the non-gradual development of language. For Müller, Kant's category of causality renders humans incapable of conceiving true origins because even the very beginnings of something must be perceived as having had a cause (Müller 1887:149, Sutcliffe 2001a:83). Where we cannot find a cause, we assume a Creator as the cause. Therefore, in Müller's mind, we can posit the sudden emergence of language as a true origin beyond human understanding, a gift from God, beyond the reach of science. Müller's application of Kant's theory of mind to his theory of language thus protected his faith, as I have argued elsewhere: 'Science, Müller reasons, dependent as it is on

the structure of the human mind and on human language, will never be able to break beyond the limits of that mind, thus leaving room for even the most scientific soul to believe in God as part of the unknowable outside of language' (Sutcliffe 2001a:83).

Finally, as language is so intertwined with human understanding, Müller gave the Science of Language the highest position among the sciences of the world, when he declared in his lecture at the University of Strassburg in 1872 that no field of scientific endeavor could escape its influence (1872:10). He divided the science of language into three stages including the empirical, which comprised grammatical analysis, the classificatory, which placed individual languages into larger classes, and the metaphysical stage. It was the metaphysical stage, however, which would deal with 'the great questions which underlie all physical research, the questions as to the what, the whence, and the why of language' which he was really interested in (Müller 1862:81; Sutcliffe 2001a:58).

2. PARALLELS TO MÜLLER IN WHORF'S THEORY OF LANGUAGE. Rollins's contention that Müller inspired Whorf to use linguistics to justify faith scientifically (Rollins 1980:52) now seems probable when Müller's refutation of Darwinism is examined, particularly given the fact that Whorf wrote his own refutation at the time he read Müller's, as shown above. Whorf's refutation does not share many arguments with Müller's, but the mere fact that Whorf wrote his own refutation shows that he, like Müller, felt that the special status of man was somewhat threatened by the development of the theory of evolution.

Whorf's mature linguistic writings, on the other hand, contain significant parallels to most of the ideas about language here attributed to Müller. Whorf held an essentially Kantian conception of mind, and he recognized the interdependence of language and thought, as well as the linguistic relativity that results from it. Moreover, like Müller, Whorf viewed language as fundamental to all human activity and therefore considered linguistics relevant to all human knowledge. I now turn to Whorf's own writings to establish these parallels⁹.

The principle of linguistic relativity itself is the clearest indicator of Whorf's Kantian basis, although Whorf was most likely unaware of his connections with Kant's philosophy. In 'The Punctual and Segmentative Aspects of Verbs in Hopi', Whorf's description of this idea sounds particularly Kantian:

[This discussion of Hopi grammar] is an illustration of how language produces an organization of experience. We are inclined to think of language simply as a technique of expression, and not to realize that language first of all is a classification and arrangement of the stream of sensory experience which results in a certain world-order, a certain segment of the world that is easily expressible by the type of symbolic means that language employs. (Whorf 1964:55)

Like Müller, Whorf viewed language as a filter through which we view the world, not unlike Kant's categories of understanding.

The second parallel, the interdependence of language and thought, follows as a natural consequence of the first. If language shapes our view of the world, it shapes our thoughts as well, as Whorf (ibid:85) states, 'Language does not just communicate thought but functions in its very inception.' Müller described this interdependence as the identity of language and thought, which brought a great deal of criticism upon him because it has most often been misunderstood. Significantly, Sapir, whose influence on Whorf is widely attested, described the interdependence of language and thought in a fashion very similar to Müller's when he wrote, 'Language and our thought-grooves are inextricably interrelated, are, in a sense, one and the same' (quoted in Joseph 1996:368). This surprising parallel between Müller and Sapir supports the interpretation of Müller's term *identity* as *interdependence* and suggests that Whorf would have understood Müller in this same way.

The uniqueness of human language, as well as the fundamental linguisticity of man's existence, can be found in Whorf (1964:220) when he says, 'There is no need to apologize for speech, the most human of all actions. The beasts may think, but they do not talk. "Talk" OUGHT TO BE a more noble and dignified word than "think"'. This quotation is strikingly similar to Müller's that we saw above in which 'man speaks, but no brute has ever uttered a word'. For Whorf, as for Müller, humans, precisely as talking beings, are more noble and dignified than animals.

Finally, Whorf's view of the relevance of linguistics to all the sciences is revealed in his article, 'Languages and Logic' wherein he shows the dependence of modern science on the structure of Indo-European languages.

Western culture has made through language, a provisional analysis of reality, and without correctives, holds resolutely to that analysis as final. The only correctives lie in all those other tongues which by aeons of independent evolution have arrived at different, but equally logical, provisional analyses. (Whorf 1964:243-44)

Linguistics thus can reveal the relativity of modern science, and, at the same time, provide the closest thing to a 'cure' for our merely provisional analysis of reality by giving science the perspective (see Whorf 1964:218) of all the various provisional analyses of reality with which to construct a more complex, and thus, more true, analysis. As he says earlier in the same article,

... science can have a rational or logical basis even though it be a relativistic one and not Mr. Everyman's natural logic. Although it may vary with each tongue, and a planetary mapping of the dimensions of such variation may be necessitated, it is, nevertheless, a basis of logic with discoverable laws. (ibid:239)

Again, it is linguistics that can discover those laws and provide a planetary mapping of the different logics of the world's cultures, making linguistics indispensable to all other sciences.

Crucially, Whorf's linguistic relativity principle, like Müller's application of Kant's categories for him, created a realm of the Ideal or Unknowable outside of language such that Whorf could preserve his faith and view science and religion as working in concert. Rollins argues that Whorf was religiously motivated throughout his life and in his linguistic writings. His descriptions of some of Whorf's early polemical writings, most of which remain unpublished, make his case particularly convincing. Early on, before Whorf began to study language, he had already decided that science and religion need not be in conflict, because science could never fully comprehend the universe. As he wrote in his novel of ideas, *The Ruler of the Universe*, which he began writing in 1924, 'We live in an unknown universe. How vast, how dark are the abysses around the little circle of knowledge that is lit by the light of the lamp of science...' (quoted in Rollins 1980:41). Once he came upon the principle of linguistic relativity, he could reinforce this failure of science to comprehend the universe fully by pointing out the relativity of its logical basis. Another early example of his defense of faith comes in an editorial to the *New Republic* published on December 9, 1925, in which Whorf 'ridicul[ed] the idea of a conflict [between science and religion]' (Rollins 1980:13) by arguing for what we would today understand as 'intelligent design':

There is a purpose in nature, and it is seen in static nature. The discontinuous and unit-wise structure of the whole universe, the concentration of matter into foci, the absence of any gradations between its major forms, the rigid restriction of matter to a definite small number of kinds (the chemical elements), the fixed set of properties possessed by each element, the discrete stepwise structure of all matter, of electricity, of light, even of energy—in these and other things the universe bears those unmistakable earmarks which, possessed by any article, would tell us that it was a manufactured article. (quoted in Rollins 1980:14)

In 1925, Whorf upheld his belief in a creator with reference to the patterned relations of the universe familiar to him from his education in chemistry. His exposure to linguistics did not change his mind. Rather, he extended his understanding of the patterned relations of the universe to include the patterns of language, as he states in *Language, Mind and Reality*:

Speech is the best show man puts on. It is his own 'act' on the stage of evolution... But we suspect... that the order in which his amazing set of tricks builds up to a great climax has been stolen—from the Universe!

The idea, unfamiliar to the modern world, [is] that nature and language are inwardly akin. (Whorf 1964:249)

If the patterning in the universe is cause to posit the existence of a creator, then the patterning in language provides even more cause, thus aligning Whorf's defense of his faith closely with Müller's attribution of the origin of language to a creator. This

parallel is even more compelling when one considers that Whorf's letter to *The New Republic* postulating intelligent design was written at the time he was reading Müller's *Chips*, which contained Müller's argument.

3. CONCLUSION. HUMBOLDT AS MÜLLER'S SOURCE. To conclude, most of the parallels found here between Whorf's and Müller's linguistic theories can also be found in Wilhelm von Humboldt's theory of language, including the principle of linguistic relativity, the identity or interdependence of language and thought, the fundamental linguisticity of man's existence, and the importance of the study of language to human understanding. A tremendous amount has been written on the subject of Humboldt's influence on Whorf with many researchers suggesting at least indirect links between Whorf and Humboldt, as well as Herder and Hamann¹⁰. Elsewhere, I have outlined the specifics of Humboldt's influence on Müller (Sutcliffe 2001b), and Koerner (1990:120), too, has linked Müller to the Humboldtian tradition. Thus, I hope to have shown here that Müller, having strongly influenced Whorf's linguistic ideas, provides another crucial link in the line of descent from Herder and Humboldt's ideas to Whorf's¹¹.

¹ 'Max' is often considered to be part of Müller's surname, especially in the United Kingdom, but this use is not consistent in the literature. I have used 'Max Müller' in the title for clarity but just Müller in the rest of the paper for simplicity.

² I have written an article exploring this topic in greater depth, forthcoming in the *Henry Sweet Society Bulletin*, entitled 'Friedrich Max Müller's Lectures on the Science of Language Made Silly: Lewis Carroll's *Alice* Books as a Reaction to Max Müller's Popular Lecture Series?'

³ Lee (1996:18) reports, for example, that there was a conference in 1953 to evaluate the value of Whorf's hypothesis, but that 'the tenor of much of the debate was negative and deeply disappointing' to Whorf's admirers. Moreover, the report of the conference became well known and has increased 'a tendency to read Whorf's work superficially or to rely on others' interpretations and judgments'.

⁴ See also 'The Müller-Whitney Controversy' (Chapter 9 in Alter 1994:484–548) for a detailed description of these articles and a historical analysis of their disagreement. (This will appear in revised form as chapter 8, 'The Battle with Max Müller', in Alter's forthcoming volume.)

⁵ I use 'Theosophist' capitalized to refer to members of The Theosophical Society and without capitalization to refer to Müller's classical use of the term.

⁶ Every reference to the word *theosophy* throughout Müller's book is used in a similar manner. For example, he explains the term *psychological religion* as encompassing 'all attempts at discovering the true relation between the soul and God', which is the true meaning of theosophy. But theosophic now 'conveys the idea of wild speculations on the hidden nature of God' (Müller 1893:91). See further Müller 1893:92, 106, and 541.

- ⁷ Humboldt also considered language and thought to be identical in this sense, for example, when he wrote , '[Die intellektuelle Thätigkeit] und die Sprache sind... Eins und unzertrennlich voneinander' [Intellectual activity and language are one and inseparable from one another (my translation)] (quoted in Sutcliffe 2001b:26). Please see Sutcliffe 2001b for a more complete discussion of this and other parallels between Humboldt and Müller.
- ⁸ Humboldt, too, rejected the idea that language could have evolved gradually, precisely because he viewed language and thought as such intertwined processes (Sutcliffe 2001b:26).
- ⁹ Lee's interpretation of Whorf in her 1996 book, *The Whorf Theory Complex*, provided the inspiration for my interpretation of Whorf along these lines. See especially her summary of the theory complex (Lee 1996:31–33).
- ¹⁰ For example, Penn notes that Sapir wrote an article on Herder's 'Ursprung der Sprache' in 1907 (1972:54); Whorf's thought is connected with Humboldt's via Boas, someone he acknowledged openly as an influence (Koerner 1990:119), who Koerner (1990:113) claims brought Humboldt's ideas to America from Germany with him in 1886.
- ¹¹ This argument directly opposes Joseph's contention that there is little evidence to support Whorf's links to the Herder-Humboldt line, whereas there is 'abundant evidence for theosophy and other brands of mysticism', whereupon he uses Müller as an example of this (1996:391).

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DISCOURSE MARKERS AND PROSODY: A CASE STUDY OF *SO*

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DISCOURSE MARKERS—words and phrases such as *like*, *so*, *y’know*, and *anyway*—are frequently found in conversation and other forms of spoken and written discourse. These words serve quite literally as markers, directing the listener’s attention to some segment of the discourse, or indicating the speaker’s intentions for the progress of the discourse. Among other things, they can be used to connect one portion of a text to another, to express exaggeration or uncertainty on the part of the speaker, or to manage the turn taking of the participants in an interaction¹.

Although there is some disagreement about how researchers should define discourse markers and their functions, Lenk (1998) provides an excellent summary of the most crucial and widely accepted features of discourse markers:

Since discourse markers are used in a strictly pragmatic manner, they do not contribute anything to the proposition of the utterance in which or next to which they occur. Instead of contributing to the proposition, discourse markers signal the sequential and ideational relationship of the two utterances between which they occur, or to other segments within the discourse. To conclude: discourse markers are short lexical items, used with a pragmatic meaning on a metalingual level of discourse in order to signal for the hearer how the speaker intends the present contribution to be related to preceding and/or following parts of the discourse. Depending on this retrospective or prospective orientation, discourse markers indicate how the current contribution is to be understood as relevant in light of the global coherence of the entire discourse. Discourse markers can have either a local or a global orientation in the discourse, expressing a local (between two adjacent utterances) or global (between discourse segments further apart) connection for the hearer. They are thus vitally important for the establishment of an understanding of coherence in conversation. (Lenk 1998:52)

As evidenced by Lenk’s definition, an understanding of a discourse marker’s context in a conversation is crucial for understanding the function of the marker itself. Most previous analyses of discourse markers have focused on this critical feature, but they have largely ignored another, very salient feature of discourse markers that may be equally important to the participants in a conversation. While listeners can certainly utilize the context of a discourse marker in order to understand its function, the marker’s prosody (its length, its changes in pitch, and its sound) provides another

immediate and readily accessible feature to aid the listener's understanding. Although several linguists have noted the importance of prosody in identifying and characterizing discourse markers (c.f. Schiffrin 2001), little research has been done on the subject. The goal of the present study is to fill this gap, and to illustrate what an analysis of prosody can reveal about the functions of discourse markers and how people understand them.

To accomplish this goal, I have analyzed the prosody of the discourse marker *so* in a sample of tokens from a corpus of conversational English. The word *so*, when used as a discourse marker, lends itself well to this type of analysis. It occurs frequently in discourse with a wide variety of functions (Schiffrin 1987), and its phonetic simplicity (the fact that it has only one consonant and one vowel) makes an analysis of its prosody manageable. Additionally, *so* has a wide variety of prosodic patterns, making it possible to compare a range of prosodic patterns to a range of functions, and to look for relationships between the two. In the present study, I use Schiffrin's characterization of the functions of *so* as a model for developing a set of categories to accurately describe the tokens of *so* in the corpus. I then analyze the prosody of the tokens in relation to these functional categories. The procedures used in the analyses of prosody and function are outlined in detail in the following sections.

2. ANALYSIS OF THE DISCOURSE-MARKING FUNCTIONS OF *so*. In this section, I discuss my functional analysis of the discourse marker *so*. First I describe an earlier study (Matzen 2001) in which I developed a set of functional categories that accurately characterize the tokens of *so* in the corpus. Next I discuss the main analysis from the present study, in which I selected a random group of tokens from a larger set of transcripts and analyzed them using the previously developed functional categories. I then analyzed and categorized these same tokens according to their prosodic features, a process described in section 4. The functional and prosodic analyses provide the basis for my investigation of the relationships between the prosody and functions of *so*.

2.1. MATERIALS. Data for this study come from volume 1 of the Santa Barbara Corpus of Spoken American English (SBCSAE) (Du Bois 2000). The SBCSAE contains a number of conversations recorded in several locations across the United States. It includes transcripts and sound files for each recording, making it possible to analyze prosodic features of the discourse. I used a subset of the transcripts in the corpus to develop a set of categories to describe the discourse-marking functions of *so*. This analysis was based on an examination of the surrounding text in the transcripts, as is done in most traditional studies of discourse markers. In the main analysis, I located every token of *so* in each of the transcripts and randomly chose 50 of those tokens for use in the study. The function of each token was determined using the categories developed in the preliminary study, and the sound files from the corpus were used to generate spectrograms for each token that were analyzed for various prosodic features.

2.2 DEVELOPMENT OF FUNCTIONAL CATEGORIES. Schiffrin (1987) has outlined three general categories to describe the functions of *so* as a discourse marker. These include marking main idea units, marking the result led to by an action, idea, or piece of information, and assisting with transitions in the conversation, such as the end of one speaker's turn. Using a subset of files from the SBCSAE, I attempted to place every token of *so* into one of Schiffrin's functional categories. Then, examining those tokens that did not seem to fit, I gradually modified her proposed categories to better account for more of the data.

For the purposes of developing functional categories that accurately described the discourse-marking functions of *so*, I excluded certain tokens from the initial analysis. Instances of *so* in which the word was performing its grammatical function (for example, when *so* was used to modify an adjective or adverb, as in *she ran so fast* and *it happened so quickly*) were removed from the data set, leaving only the discourse-marking functions of *so*. In addition, I excluded instances where a speaker used *so* in an utterance but was interrupted before his or her intentions were made clear, or where a speaker repeated another speaker's utterance word-for-word.

2.3. RESULTING FUNCTIONAL CATEGORIES. The uses of *so* in the corpus fall into four main categories, some of which have several subcategories. In the first category, *so* serves as a marker of the main topic of discourse. The subcategories in this area include (1) bringing up a new topic, (2) returning to the main topic after a deviation, and (3) returning to the main topic in order to summarize it. The second category is closely related to the first and contains the cases in which a speaker uses *so* to end his or her turn. In the third category, *so* is used to mark information that one participant in a conversation wants to obtain from another participant. In these cases, *so* can be a part of a direct question, or it can be used to present an inference which another speaker must then confirm or deny. The fourth category for the usage of *so* seems to be related to its grammatical function. In this category, *so* is used either to present the result of some event or action, or to present the reason for some event or action. A more complete description of each category, as well as an example of each, is given in the sections below.

2.3.1. MARKING THE MAIN TOPIC OF DISCOURSE. *So* is frequently used in discourse to mark the main topic of conversation or the main point of a narrative. It serves as a marker to delineate the main points in the flow of information, as if it were the bullet preceding each heading on an outline. Within this general category, *so* can be used to mark a new topic that has been introduced to the discourse for the first time or to return to the main topic after a short digression or the presentation of a subtopic. *So* can also be used to mark a summary of the main topic of discourse, including summaries at the end of a narrative such as a resolution or coda.

By far the most common of these three subtypes is simply returning to the main topic of discourse. A prototypical example of this usage is shown in the following excerpt from 'Actual Blacksmithing'²:

- (1) LYNNE: and they go through .. %every kinda ligament.
 and I mean,
 there's,
 ... (H) millions of ligaments,
 and millions of .. tendons,
 you know,
 well not millions,
 but,
 .. I mean,
 LENORE: yeah,
 [I bet].
 LYNNE: [(H) and <X then X>],
 → so we had to know these tendons,
 and ligaments,

In this segment, Lynne is explaining one of her classes to Lenore, a guest. She is talking about having to learn the tendons and ligaments in a horse's leg, but then makes a slight digression to describing the large number of tendons and ligaments they had to learn. When she returns to the main point of what she had to learn for her class, she prefaces the return with *so*.

2.3.2. CLOSING A TURN. The second major category in my analysis includes *so* when it is used to close a turn. This is similar to what Schifffrin describes the use of *so* in participation structures, meaning that it assists with transitions within the conversation. However, I see this use of *so* as being more closely related to the first category described. If *so* is a marker of the main information or main topic of discourse, and one speaker uses *so* but does not continue, it leaves the floor open for another speaker to step in and provide one of the things that follows *so* in the first category: a new topic, a return to the current main topic, or a summary of the current main topic. The following is an example of this usage from the transcript 'Zero Equals Zero':

- (2) KATHY: ... Okay.
 → .. I don't know this one *so*=,
 NATHAN: .. You don't know how to do this one?
 ... So we in trouble.

In this segment, Kathy says *so* but does not continue, and Nathan steps in by repeating her phrase and filling in the missing information, as he sees it. Tokens of *so* in this category tended to have a long pause following the intonation unit that differentiated them from cases in which the speaker was merely interrupted.

2.3.3. MARKING A REQUEST FOR INFORMATION. The third general category includes cases where *so* is used to mark information that one of the participants in the discourse

wants to acquire. This category includes two subcategories. The first is when *so* is used in a direct question. In this case, the person asking the question does not know some piece of information and is directly requesting it from the other participants. The second subcategory is when *so* is used to present an inference for which the speaker wants confirmation. The speaker has some knowledge of the information, or is forming a conclusion based on what another participant has said, and is requesting clarification or confirmation of the inference. A typical example of this discourse-marking category comes from 'Conceptual Pesticides', as shown here:

- (3) MARILYN: ... Okay,
 → so did we decide we do or do not want potatoe=s.

In this example, the speaker wants to obtain some piece of information from the interlocutors and asks a question in order to get that information. *So* is used to highlight the desired information, just as it was used to highlight the main topic of discourse in other situations.

A more common use of *so* when requesting information is as the preface to an inference. An example of that use is as follows, from 'Actual Blacksmithing':

- (4) LYNNE: ... You're standing like thi=s you know?
 (H) And like,
 %when you're in the back,
 the horse's hoof ... %_lays like this right over you?
 and you're,
 .. like this working?
 you know?
 (H) This is like a hoof knife,
 then a --
 @you [@know].
 → LENORE: [So you're always bent over].
 LYNNE: You're always bent over.

In this case, Lynne is describing an action, and Lenore makes an inference about that action. Lenore then presents her inference to Lynne in order to have it confirmed or denied, and she highlights the inference with *so*. *So* is also used in this manner when one of the participants in a conversation wants clarification on some piece of information.

2.3.4 MARKING REASON OR RESULT. *So* can be used to indicate the reason for some action or event or to mark the result of some action or event. Although they are converse functions, I chose to put both reason and result into one category because they both seem to be related to *so*'s grammatical role. According to *Webster's Universal College Dictionary*, *so* in its sentence-level grammatical function means '8. having the purpose of. 9. hence;

therefore... 13. in such a manner as to follow or result from.' When used as a discourse marker, *so* can perform these same functions on a more global scale, tying together multiple utterances and ideas. In the SBCSAE, there are several instances where speakers use *so* to present the reason for an action they are currently performing, as in this example from 'Conceptual Pesticides':

- (5) MARILYN: ... It's pretty funny.
 ... Well let's just ... woop it up and put a little olive oil in here,
 → so these don't burn to death.

This usage of *so* is infrequent in the corpus, but it is very consistent. Each time *so* is used in this manner, it pertains to the speaker's current activity.

The use of *so* to mark a global result appears somewhat more frequently in the data. There are several examples like the following, from 'Actual Blacksmithing':

- (6) LYNNE: that would be a th- .. nine hundred dollars,
 «SNAP +just SNAP» like tha=t.
 ... <SM I mean,
 could you imagine SM> ?
 → (H) So,
 ... w- you know,
 ... like,
 a lot of people,
 .. that have a lot of horses and stuff,
 .. and that they're riding a lot,
 they'll just,
 (H) ... let the college kids do em.

In this example, the inference that people let college kids shoe their horses is presented as a result of it being very expensive to get a large number of horses shod. *So* here is functioning on a more global level than it would if it were simply prefacing the result of an event within a single sentence, such as 'the car was old, *so* it didn't always start'. For that reason, these examples of *so* are classified as discourse markers even though their function is closely related to their grammatical usage. As before, when *so* marks the reason for or result of an action or event, it is highlighting the most important information in a segment of discourse.

2.3.5. DIFFICULTIES IN CATEGORIZATION. Although most of the instances of *so* in the data fit easily into one of the four categories described above, there were a few that could have been placed in more than one of these categories. Despite the presence of tokens that seemed to be performing multiple discourse marking functions, there were no examples of *so* being used as a discourse marker that did not fit into any of the categories. This provides strong evidence for the existence of the categories themselves. In

Function		Number
Marking Main Topic	Return to main topic	19
	Summary of main topic	14
	New topic	1
Closing Turn	Closing a Turn	3
Request for Information	Direct Question	2
	Inference	1
Reason or Result	Reason for action or event	4
	Result of action or event	11
Total		55

Table 1. Results of the main functional categorization.

situations where a token of *so* could be categorized in more than one way, I classified the token as a member of both categories, reflecting its multifunctional nature.

2.4. CATEGORIZATION OF TOKENS FOR THE MAIN ANALYSIS. Once I had developed an accurate set of functional categories to describe the usage of *so* as a discourse marker, I used these categories to classify the 50 tokens of *so* for the main analysis. These 50 tokens were selected randomly from among all of the tokens of *so* in the SBCSAE. As before, I used discourse context to classify each token of *so* as a member of one or more functional categories. Later in the study, I removed one of the tokens from the analysis because of background noise which made its prosodic features impossible to determine. The results of the categorization for the remaining 49 tokens are shown in **Table 1**.

As stated previously, I classified those tokens that perform two functions simultaneously as members of both functional categories. There are six such tokens in the main analysis. Two mark both a direct question and a return to the main topic, two mark both the result of an action or event and a return to the main topic, one marks both the result of an action or event and a summary of the main topic, and one token is used both to close a speaker’s turn and to summarize the main topic of conversation. The presence of these six multifunctional tokens in each of two functional categories accounts for the total number of tokens (55) included in **Table 1**.

3. ANALYSIS OF THE PROSODIC FEATURES OF *SO*. The second phase of this study was an analysis of the prosody of the discourse marker *so*. Once I had divided the 50 tokens from the main analysis into the four functional categories, I proceeded to analyze a variety of prosodic features for each token. This second phase of the analysis allowed me to compare prosodic differences to differences in function, thereby examining the relationships between function and prosody. In this section, I will describe the procedure involved in the phonetic analysis, the prosodic features that I examined,

and the categories that I developed to describe the variations within each prosodic category.

3.1. DEVELOPMENT OF PROSODIC CATEGORIES. I used the phonetic analysis software *Praat* (<http://www.praat.org>) to generate spectrograms for the 50 tokens of *so* that were examined in this study. I then developed categories to describe each of four prosodic features for each token of *so*. I recorded the length of each token in milliseconds and used that data to divide the tokens into categories based on length. For the vowel in each token, I measured the average pitch (F0), as well as the maximum and minimum values for F0 and its value at the beginning and end of the vowel. I used this information, along with pitch contour information available from the spectrograms, to group the tokens into another set of prosodic categories based on the pitch change over the course of the vowel. Additionally, I used the corpus sound files to make a judgment about the sound of the pitch changes in each segment. Although this judgment was inherently subjective, this category is far more important in the analysis than any of the other phonetic categories, for the simple reason that it is the most accurate representation of the information available to a listener in an actual conversation. All of the prosodic categories based on quantitative data would be meaningless if the differences between the categories were inaudible. Thus, an auditory analysis of the tokens was crucial both for developing the categories based on the quantitative data (in order to make them reflective of the perceptible differences among the tokens) and for understanding which prosodic features were most accessible to a participant in the conversation.

Also incorporated into the analysis were other pieces of information gathered from the SBCSAE transcripts. I recorded the token's position in its intonation unit and in the speaker's turn. Both IU position and turn position are potential cues as to the function of *so*, and I examined the tokens' positions in order to look for relationships between this feature and variations in function and prosodic features.

3.2. LENGTH CATEGORIES. The lengths of the 50 tokens examined ranged from 114 milliseconds to 611 milliseconds. I used both the spectrograms and the sound files to identify clusters of tokens with approximately the same lengths. Tokens were defined as 'Short' if they were less than 140 milliseconds in length and had no audible vowel. 'Medium' tokens were defined as those between 140 and 300 ms in length, and any token longer than 300 ms was classified as 'Long'. There were a total of five short tokens, 32 medium tokens, and 13 long tokens.

3.3 PITCH CONTOUR CATEGORIES. Of the 49 tokens of *so* used in this study, one has no F0 because it was spoken with no vowel whatsoever. The remaining tokens have a clear F0 that can be tracked in the spectrograms. Using a visual analysis of the spectrograms and the five different measurements of F0 for each *so*, I grouped these tokens into categories and subcategories of similar pitch contours. Each of the resulting categories is described below.

3.3.1. **FLAT F0.** For the 23 tokens in this category, the average value for F0 and the values of F0 at the beginning and end of the vowel are very close together. Quantitatively, this category is defined as containing tokens that have less than a 15 Hz difference between F0 at the beginning and end of the vowel. These tokens are also easily identifiable by their flat pitch trace in the spectrograms.

3.3.2. **STEADY DOWNWARD SLOPE.** A second category based on pitch contour contains those tokens of *so* with a steadily decreasing F0. In these 17 tokens, F0 is higher at the beginning of the vowel than at the end, and the average value for F0 falls approximately midway between the initial and final values. Additionally, for the tokens in this category, the maximum value of F0 is its initial value, and the minimum value of F0 matches its final value.

3.3.3. **CURVED F0 CONTOURS.** The larger category of curved F0 contours contains two subcategories representing different patterns of change in F0. The first subtype includes eight tokens that have downward curving F0's which level off over the course of the vowel. In these tokens, F0 is higher at the beginning of the vowel than at the end, and the average value for F0 is much closer to its final value.

A second subtype containing five tokens has the opposite pattern, with an F0 contour that begins relatively flat and later curves more steeply downward. As before, F0 is higher at the beginning than at the end of the vowel, but this time the average F0 is closer to its value at the onset of the vowel.

3.3.4. **DISCONTINUOUS F0 CONTOURS.** There are four tokens of *so* whose F0 contours do not fall into any of the above categories. For those tokens, the pitch contour is discontinuous because the speaker was talking with a creaky voice

3.4. **AUDITORY PERCEPTION CATEGORIES.** Categorizing the tokens of *so* used in this study on the basis of auditory perceptions revealed several categories that are perceptually distinct. Both differences in length and pitch changes are clearly audible in the tokens, allowing for categorizations based purely on perception. The categories based on the length of the tokens, measured as described above, were borne out in the auditory data. There is a group of tokens with a rushed, clipped sound that corresponds to the short length category. These are described by the Clipped sound category, which contains 12 tokens. There is also a group of tokens that sound drawn out that correspond to the tokens in the long category. The medium length tokens are distinguishable from the other two groups by sound, but they are not easy to distinguish from one another. The long and medium tokens are included in the categories based on pitch changes that are described below.

The perceptual categories for pitch changes match well with the categories derived from the spectrograms and measurements of F0. There is a small group of tokens that have a steady-sounding pitch (forming a Steady sound category with 12 tokens), and many tokens that have a pitch with a falling sound (forming the Falling sound

category with 19 tokens). There are a handful of tokens whose sound is ambiguous, and it is difficult to tell whether they have a falling or steady pitch. The two ambiguous tokens are classified as such in the Ambiguous sound category. One final, distinct-sounding group of tokens is made up of those with a creaky or glottal sound. These four tokens correspond to the tokens with discontinuous pitch contours, and they form the Creaky/Glottal sound category

3.5. POSITION IN THE INTONATION UNIT. The majority of the tokens of *so* occur at the beginning of an intonation unit. A total of 39 tokens occur as the first word in an IU, with an additional 9 tokens occurring as the only word in an IU. Only one token appeared as the final word in an IU, and none of the discourse markers appeared in the middle of an IU (i.e. as any word other than the first or last word in the IU, not including those tokens that were preceded by another discourse marker).

3.6. POSITION IN THE CONVERSATIONAL TURN. Just as the tokens of *so* tend to occur in a specific place within IUs, they also occur predominantly in similar places within conversational turns. Eleven tokens appear as the first word of a speaker's turn, and two occur as the only word in a turn. Additionally, five tokens are used in the last IU of a turn. The majority of the tokens, 31 altogether, occur somewhere in the middle of a speaker's turn.

4. RESULTS. In order to examine the relationship between function and prosody for *so*, I organized the data into tables comparing the functional categories to individual prosodic categories, and also various prosodic categories to one another. The resulting patterns and groupings are discussed in detail in this section.

4.1. RELATIONSHIPS AMONG PROSODIC CATEGORIES. As expected, there is a close correspondence between the various prosodic categories. For example, every token with a flat pitch contour fell into either the Steady or the Clipped sound category, and nearly all of the Short tokens are also in the Clipped sound category. There are also relationships between the prosodic categories and the classifications based on IU or turn position. The majority of the IU-initial tokens (32 out of 44) fall into the Medium category, while most of the tokens that appear as the only word in an intonation unit (eight out of nine) are in the Long category.

4.2 RELATIONSHIPS BETWEEN FUNCTIONAL CATEGORIES AND PROSODIC CATEGORIES. The distribution of all of the tokens of *so* across the functional and prosodic categories is shown in **Table 2**.

4.2.1. FUNCTION AND LENGTH. As illustrated in **Table 2**, token length differentiates the Closing a Turn category from all of the others. In the other functional categories, most of the tokens fell into the Medium category. However, when *so* is used to close a turn, it tends to be very long and drawn out. Of the three tokens of *so* in the data

Prosody		Function				Category Totals
		Mark- ing Main Topic	Closing a Turn	Request for Infor- mation	Reason or Result	
Length	Short	4	0	1	4	9
	Medium	20	1	2	10	33
	Long	10	2	0	1	13
Pitch Con- tour	Flat	9	1	2	10	22
	Steady Drop	13	0	1	2	16
	Leveling Curve	5	1	0	2	8
	Steepening Curve	4	1	0	0	5
	Discontinuous	3	0	0	1	4
Sound	Steady	6	1	0	6	13
	Clipped	8	0	1	4	13
	Falling	16	2	2	3	23
	Ambiguous	1	0	0	1	2
	Creaky/glottal	3	0	0	1	4
IU Posi- tion	Only	6	2	0	1	9
	Initial	28	1	3	13	45
	Final	0	0	0	1	1
Turn Position	Only	0	2	0	0	2
	Initial	10	0	3	1	14
	Middle	21	1	0	12	34
	Last IU	3	0	0	2	5

Table 2. *Distribution of tokens.*

that perform this function, two fall into the Long category. The third falls into the mid-range category, but it seems to be performing two functions at once, both summarizing the preceding conversation and indicating that the speaker wanted to end her turn. This slight difference in function may explain the difference in the length of that particular token.

4.2.2. FUNCTION AND PITCH CONTOUR. As with the length categories, in the pitch contour categories there are clusters of tokens with the same function that have similar pitch contours. Also as before, tokens fulfilling two roles simultaneously are often distinct from other tokens in one of their shared functional categories. In the Reason or Result functional category, 10 of the 15 tokens have a flat pitch contour. Of the remaining five tokens, three were multifunctional.

4.2.3. FUNCTION AND SOUND. The subjective sound of the pitch changes in the tokens also shows different patterns for the different functional categories of *so*. Overall,

most tokens sound as though they had a falling pitch, with a handful of exceptions in each category. However, in the Reason or Result functional category there were many more tokens (six out of 14) with a steady sound. Only three of the tokens in this functional category had a falling sound, and all three of those tokens were multifunctional, also serving to mark the main topic of conversation.

4.2.4. FUNCTION AND IU POSITION. For every functional category except for one, the vast majority of the tokens appear at the beginning of an intonation unit. However, when *so* is used to close a speaker's turn, it usually appears as the only word in an IU (in these cases, *so* follows back channeling by another speaker). As before, the only token of *so* in the Closing a Turn category that does not conform to the pattern is a multifunctional token.

4.2.5. FUNCTION AND TURN POSITION. Turn position also serves to differentiate the functional categories from one another. For the Marking the Main Topic and Reason or Result functional categories, most of the tokens appear in the middle of a turn. As before, several of the tokens in those two categories that did not conform to the pattern are multifunctional tokens. When *so* is used to close a turn, two of the three tokens occur as the only word in a turn and the third is the multifunctional token that is often distinct from the other two. The Request for Information functional category also follows a distinct pattern because all of the tokens are turn initial.

5. DISCUSSION. The results of this study show that prosody can be a useful tool for studying and understanding discourse markers. Each of the prosodic features that I examined distinguishes at least one of the functional categories of *so* from all of the others (see **Table 4** for a summary). Additionally, my results show that prosodic features can distinguish multifunctional tokens of *so* from those performing only one function. Despite the clear relationships between prosody and some functional distinctions, not every functional category has a unique prosodic pattern, a result that raises several interesting questions. In this section, I discuss all of these results and their implications for understanding *so* and for studying discourse markers in general.

5.1. LIMITATIONS FOR PROSODIC CATEGORIES. Although prosody is quite useful in differentiating certain functional categories from the others, the tokens in each functional category show a good deal of variation in their prosodic features. Variation of this sort is to be expected, as speech is a fluid and immensely variable act that is affected by an enormous range of factors not captured in my analysis. A good example of this sort of variation is one that could have had an effect on the length categories used in this study. The length of a token of *so* depends on many factors above and beyond its function as a discourse marker. The speed of a talker's speech will change the length of each individual word, and factors ranging from dialect to the context of the conversation can affect this speed. Because of these factors, tokens of *so* performing the same discourse marking function can fall into different length categories for reasons that have nothing

to do with their function. This sort of variation is inherent in speech, and no matter how strong the relationship between function and prosody, data from real speakers shows a wide range of differences within functional categories. The other participants in a conversation may be able to adjust their interpretation of various words according to their experience with the talker's speaking style, but that kind of adjustment would be exceedingly difficult to quantify in a study.

Another difficulty with the prosodic categories that I developed in this paper is that they are somewhat arbitrary divisions of variables that are, in reality, a continuum. The categories based on length are once again an excellent example of this. Although I attempted to base the categories on audible differences in length, it is impossible to find a true dividing line that separates every short-sounding token from every longer-sounding token. Participants in a conversation probably perceive length and the other prosodic features as a continuum and respond to them accordingly. However, for the purposes of this study, it was necessary to impose divisions onto each category.

Despite these potential problems, the final categories represent the data quite well. For example, the results discussed above indicate that, as one would expect, all of the prosodic features for a speaker's utterances are highly interrelated. The features are not simply a collection of individual factors that vary independently of one another. The results of the categorizations reflect this, a fact that provides support for the categorizations themselves. If the categories fail to show relationships among the prosodic features, one would have to be very skeptical of them. However, this was not the case, and as the results of the categorizations show logical patterns of relationships among the categories, I believe that they are successful in organizing the relevant data. Most importantly, the Sound category, which provides the closest approximation to the experience of a participant in the conversation, corresponds very well to the other prosodic categories. This finding indicates that the prosodic categories outlined here are meaningful and potentially useful to participants in a conversation.

One potential limitation of these findings, from the perspective of general social science research, is the lack of a statistically-based correlation of the features examined in this study. I elected not to perform such an analysis for several reasons. First, the nature of speech creates a number of confounding factors in the data and makes it impossible to treat the variables I examined as true independent variables. For example, all of the prosodic features that I examined are highly interrelated, and the effects of each one on the others would be extremely difficult to separate. Additionally, my use of transcripts that have different speakers talking with potentially different dialects and in different settings introduces a large amount of complex variability to the data. The complexities of speech production in real-world situations are not well-suited for a statistical analysis. Finally, this study is intended to be a descriptive analysis of the relationships between prosody and function for a discourse marker, and it is unclear that a statistical analysis would add a great deal of value to this first, exploratory description. Finding statistical models appropriate for dealing with the complexities of human speech is an ongoing challenge for the field of linguistics. This is a much-needed area of future research, which in turn would be highly beneficial

to future investigations of the function and prosody of discourse markers and other features of naturally-occurring language.

5.2. RELATIONSHIPS BETWEEN PROSODIC AND FUNCTIONAL CATEGORIES. The prosodic features that examined in this study clearly and consistently differentiate certain functional categories from others. When *so* is used to close a speaker's turn or to mark the reason for or result of an action or event, it follows very different prosodic patterns than when it is performing any other function. At the same time, tokens of *so* that are used to mark the main topic of conversation or to preface a request for information are quite different from the other two functional categories, but never different from one another. All of these findings and their implications will be discussed in this section.

5.2.1. PROSODY OF *SO* USED TO CLOSE A TURN. The tokens of *so* that serve to close a speaker's turn are prosodically distinct from the others in a pattern that appears repeatedly in the data. While the majority of the tokens in every other category are medium in length, the majority of the tokens used to close a turn are long. While most of the tokens of *so* occur as the first word in a longer IU, the tokens being used to close a turn tend to be uttered alone, as the only word in an IU. In addition, most of the tokens used to close a turn appear as the only word in a speaker's entire turn, while the majority of tokens in every other category fall somewhere in the middle of a speaker's turn. In fact, of all the tokens examined in this study, the only two that occur as the only word in a speaker's turn are both being used by the speaker to relinquish the floor. In both cases, the tokens appear after back channeling by another participant in the conversation. It is as if the speaker who holds the floor takes the back channeling as a sign that the listener has something to say and uses *so* to indicate that he or she can step in.

One token of *so* in this category exhibits a different prosodic pattern than the others. This token is multifunctional, serving both to summarize the main topic of conversation and to close the speaker's turn. It is different from the tokens that only mark the close of a turn in every prosodic category, and instead follows the pattern of tokens that are used to summarize the main topic of conversation. For example, the multifunctional token is medium in length, rather than long, it occurs as the initial word in a longer IU, and it appears in the middle of a speaker's turn. All of these features match those of a token being used to mark the main topic of conversation. This result could indicate Marking a Return to the Main Topic is a powerful functional category, which overrides the prosodic features of other functional categories for multifunctional tokens.

5.2.2. PROSODY OF *SO* USED TO MARK A REASON OR RESULT. When *so* is used to mark the reason or result of an action or event, its prosody is also quite distinct. Token length and the tokens' IU position do not distinguish this category from any except the Closing a Turn category, but its prosody on every other dimension was unique.

The tokens in this functional category most often have a flat pitch contour and a steady-sounding pitch, whereas the majority of the tokens in other functional categories have a falling pitch contour of some sort and a falling-sounding pitch. In addition, the tokens in this category occur in the middle of a speaker's turn with very few exceptions, which is not the case for any other functional category. As discussed previously, tokens of *so* that mark the close of a speaker's turn appear as the only word in a turn, those marking a request for information appear as the initial word in the turn, and those marking a return to the main topic are distributed across the turn-initial and turn-medial categories.

As with the tokens of *so* serving to mark the end of a speaker's turn, the tokens in this category that do not fit these general prosodic patterns are usually serving multiple functions simultaneously. The second function of all those tokens is marking the main topic of conversation.

Once again there is a familiar pattern in these findings. The Reason or Result category is distinguished from every other category by several of its prosodic features. Prototypically, the tokens in this category have a steady sound with little to no change in pitch over the course of the vowel, and they are almost never used at either the beginning or end of a speaker's turn. This pattern seems to fit the meaning of this category. When *so* marks the reason for or result of an action or event, it performs a discourse-marking task that is similar to its grammatical function. *So* in its grammatical context is typically in the middle of the sentence and it is not a salient word because its function is simply to link two parts of a sentence together. When performing this same task on a more global level, it makes sense for *so* to be used primarily in the middle of a speaker's turn. It maintains its role as a link between two pieces of information, and the utterance of those pieces of information is likely to make up the rest of the speaker's turn, with the *so* falling in the middle and marking the relationship between the two. The lack of emphasis that appears with the grammatical functions of *so* is carried over to this discourse-marking function, giving rise to tokens that are clipped or steady sounding, and have little variation across the duration of the vowel.

5.2.3. FUNCTIONAL CATEGORIES WITHOUT UNIQUE PROSODIC PATTERNS. While the Closing a Turn and Reason or Result functional categories have prosodic patterns distinct from each other and from the other two functional categories, no prosodic feature clearly differentiates the Marking the Main Topic and Request for Information categories from each other. The only slight difference between the two is that tokens marking a request for information are always turn-initial, while those that are marking the main topic of conversation are more likely to fall in the middle of a speaker's turn. This finding is reasonable because a question is typically a turn with a single IU, and if *so* is to preface the question, it must occur at the beginning of the turn. In contrast, a return to the main topic or a summary of the main topic can occur at the beginning of a speaker's turn, but it is more likely to occur somewhat later in the turn, making the discourse marker that indicates it more likely to be turn-medial. Because the difference in turn position is the only factor that distinguishes the Marking the

Function		Number
Marking Main Topic	Return to main topic	19
	Summary of main topic	14
	Introduce new topic	1
	Request for information	3
Closing Turn	Closing a Turn	3
Reason or Result	Reason for action or event	4
	Result of action or event	11
Total		55

Table 3. *A reorganization of functional categories.*

Main Topic and the Reason or Result functional categories, and because it is easily explained by the probability of each of these actions occurring at different positions within a speaker’s turn, I believe that it is not sufficient to distinguish the two categories from one another.

The lack of prosodic distinction between the other two categories may stem from the high percentage of multifunctional tokens in the Request for Information category. Two of the three tokens that mark a request for information are multifunctional and also mark a return to the main topic of conversation. Just as for the other functional categories, the multifunctional tokens conform to the prosodic patterns of the Marking the Main Topic category. Possibly, for the Request for Information category, there are simply not enough tokens with a single function to allow for a prosodic distinction between this category and Marking the Main Topic.

However, this situation raises another interesting possibility. It is possible that the lack of prosodic distinctions between these two categories is not due to the multifunctional nature of the tokens, but rather stems from an inaccurate organization of the functional categories themselves. These findings may call for a reorganization of my original functional categories. It might be more accurate to consider a request for information as a subcategory of Marking the Main Topic. The close relationship between the two categories can be described as the relationship between a superordinate and a subordinate category, which may be more explanatory than simply writing off the similarities as being due to the high number of multifunctional tokens.

The only way to determine which explanation is true would be to examine the prosodic patterns for many more tokens of *so* that mark a request for information. If a larger number of tokens serve only one function, and the two functional categories showed distinctions based on prosodic features, one could conclude that the Request for Information category is rightfully an independent category. However, I believe that it would be extremely difficult to find sufficient numbers of tokens that mark only a request for information and do not mark a reference to the main topic at the same time. The functions of the categories are simply too interrelated, and occur together too frequently. This in itself provides some evidence for the idea that the Request for Information should be more accurately considered a subcategory of Marking the Main Topic.

Functional Categories	Typical Prosodic Features				
	Length	Pitch Contour	Sound	IU Position	Turn Position
Marking Main Topic	Medium	Flat/Steady Drop	Falling	Initial	Initial/Middle
Closing a Turn	Long	Downward Curve	Falling	Only	Only
Reason or Result	Short/Medium	Flat	Steady	Initial	Middle

Table 4. *The typical prosodic features for each functional category.*

The set of functional categories resulting from this reorganization is shown in **Table 3**. If arranged in this manner, every functional category of *so* would be clearly distinguished from every other category by a unique pattern of prosodic features. The typical prosodic features for each functional category are shown in **Table 4**.

5.3. IMPLICATIONS OF THE RELATIONSHIPS BETWEEN PROSODY AND FUNCTION. The prosodic patterns of the multifunctional tokens of *so* illustrate a striking fact about the relationships among the functional categories. The results consistently show that when *so* is performing multiple discourse-marking functions, it is likely to have a different set of prosodic patterns than it does when it is performing only one function. In every case, these tokens conform to the typical prosodic patterns associated with the Marking the Main Topic category. This, combined with the high degree of similarity between tokens of *so* used to mark the main topic and those used to preface a request for information (and the possibility that these tokens are actually a subset of the same category), could indicate that Marking the Main Topic is essentially the primary or default discourse-marking function for *so*. It is the category with the most members, and even when there are multifunctional tokens performing this and another discourse-marking function, they take on this default prosodic pattern. Further evidence for this idea comes from the fact that for every multifunctional token of *so*, one of the token's functions is to mark the main topic. There is no instance in the data of a multifunctional token crossing different categorical boundaries. If Marking the Main Topic is the default or core function of *so*, it makes sense that some of its members can be multifunctional and cross into different functional categories (all the time maintaining the prosodic pattern of the core function), while members of the less central functional categories cannot cross category boundaries in other directions.

The functional categories can be thought of as a continuum extending in two directions from a central point. The central point of the continuum and the central functional category is Marking the Main Topic. On either side of this center point is one of the more peripheral functional categories. The boundaries between the categories are fuzzy, allowing for multifunctional tokens of *so*. These tokens can be represented as points along the continuum that fall into boundary areas where one of the peripheral functional categories overlaps with the central functional category. Because of the linear structure of the continuum, the two peripheral categories do

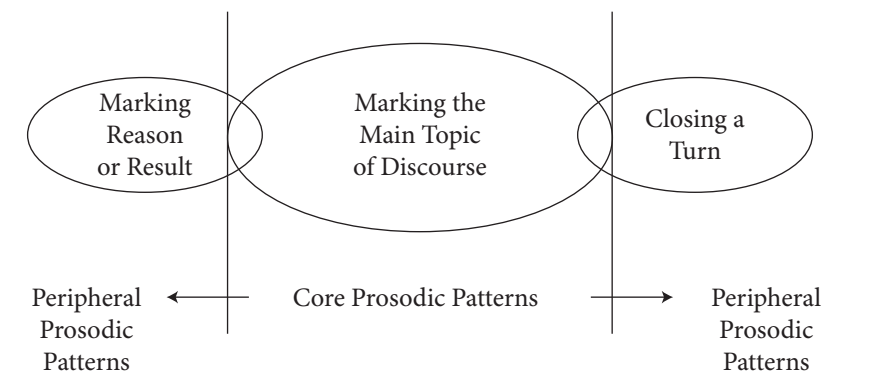


Figure 1. Pictorial representation of the relationships between functional categories.

Functional Categories	Typical Prosodic Features			
	Length	Pitch Contour	Sound	Prosodic Continuum
Reason or Result	Short/Medium	Flat	Steady	↕ Extreme Values
Marking Main Topic	Medium	Flat/Steady Drop	Falling	
Closing a Turn	Long	Downward Curve	Falling	

Table 5. Functional categories and prosodic continuum.

not have any overlapping areas, and there cannot be multifunctional tokens of *so* that perform both of the peripheral functions.

Just as there is a continuum of function, there is also a continuum of prosodic features, with the central functional category having the most central and dominant prosodic features. These features change as one moves in either direction along the continuum, allowing the peripheral functional categories to have different sets of prosodic features. However, because the prosodic features of the central functional category are the dominant ones, they are retained in the multifunctional tokens that fall in the areas of overlap between the functional categories.

These ideas are represented schematically in **Figure 1**. Each oval represents one of the functional categories, arranged along the continuum of possible functions. The locations where the circles overlap indicates possibilities for tokens to serve multiple functions while retaining the features of the core discourse-marking function. Similarly, the figure shows a continuum of prosodic features. The vertical lines represent the prosodic divisions between the functional categories, and show that the multifunctional categories retain the prosodic features characteristic of the core functional category.

The typical prosodic features for each functional category can be reexamined in this light, and an intriguing pattern emerges (**Table 5**). For every prosodic category,

the tokens of *so* that mark the main topic of discourse are spread across a mid-range of the possible prosodic categories, while the features for the tokens that mark the close of a speaker's turn or a reason or result are distributed on either side of these intermediate tokens, on the extreme ends of each prosodic scale.

For every prosodic category, the tokens of *so* serving to mark the main topic have an intermediate range of typical features. These tokens tend to be medium in length, to have a flat or steadily dropping pitch contour, and to have a falling sound. In other words, the tokens tend to have a moderate amount of change over the course of the vowel. The tokens that mark the main topic tend to have more variety in their prosodic features, but nearly all of the tokens fall in a prosodic category that represents the mid-range of the prosodic continuum in question. The lower extreme of the prosodic continuum in each case, representing the tokens whose prosody does not change much over the course of the vowel, is occupied by tokens of *so* marking a reason or result. These tokens tend to be short or medium in length, to have a flat pitch contour and a steady, unvarying sound. The other extreme of the scale, where the tokens change a great deal through time, is occupied by tokens of *so* that mark the close of a speaker's turn. These tokens are characteristically long, have a downward curving pitch contour and a falling sound. The group is also on an extreme in some sense when looking at IU position and turn position. For each of these categories, the tokens of *so* used to close a turn are typically alone in an intonation unit or turn, which was highly unusual for tokens in any other functional category.

All of the patterns described above support the idea that the discourse marker *so* has a core function in which it serves to mark the main topic of conversation. Extensions of this core have different functions, and they also have different prosodic features that represent extensions along a continuum of prosody in either direction away from the features that are typical for the core function. This structure, made visible by the combined investigation of the prosody and function of *so*, provides a clear picture of how *so* can be used and how speakers and listeners can ascertain its meaning in a natural conversation.

6. CONCLUSIONS. In this study, I have examined the functional and prosodic categories describing the discourse marker *so* and have found clear relationships between the two. An examination of prosody proves to be a useful tool in the analysis of *so* and its functions. Prosody can not only distinguish the functional categories of *so* from one another, but also inform the structuring of the functional categories, creating a more complete picture of how speakers and listeners use and understand *so* in conversation.

Both context and prosody are important in this study, and the analysis of each one improves the analysis of the other. Through the results of this study, *so* can be understood as having a core function (marking the main topic of discourse) and two related functions (closing a speaker's turn and marking the reason for or result of an action or event) that are related to the central function as linear extensions along a continuum. Similarly, there are contextual cues and a continuum for each of several prosodic features that serve to distinguish the two peripheral functions from the core.

While my analysis of the relationships between function and prosody of *so* made this structure quite clear, it would not be at all apparent without the prosodic information. Prosodic features, in combination with context (including IU position, turn position, and the surrounding utterances in the discourse) are therefore extremely useful for elucidating the structure and usage of *so*.

¹ The author would like to thank Robert Englebretson for his invaluable guidance and the Rice University Undergraduate Scholars Program for providing funding for this project.

² Transcription in this article uses the following conventions (adapted from Du Bois et al., 1993): each transcript line represents a single Intonation Unit; speaker labels appear in uppercase, and are followed by a colon; simultaneous speech is indicated by aligned square brackets [].

.	Final intonation contour.	=	Prosodic lengthening.
,	Continuing intonation contour.	%	Glottal stop.
?	Appeal intonation contour.	..	Short pause.
--	Truncated Intonation Unit.	...	Long pause.
-	Truncated word.	(H)	In-breath.
⟨X ... X⟩	Uncertain transcription.	@	One pulse of laughter.
⟨SM ... SM⟩	Smiling intonation.		

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II



LINGUISTIC
RELATIVITY
&
HISTORICAL
PERSPECTIVES



TOWARD A DECIPHERMENT OF JELA 1 AND 2

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IN AN ARTICLE in a recent issue of *The Journal of Indo-European Studies* (Griffen 2003), it is demonstrated that the inscriptions known as ‘Vinča signs’ do indeed represent linear writing. These signs were inscribed on various objects in the fifth millennium BCE in an area around Vinča, Serbia, within the cultural domain designated by Gimbutas (1997) as ‘Old Europe’. The fullest, most accessible catalogue of these signs is found in Winn (1981).

1. VINČA SIGNS AS LINEAR WRITING. The salient evidence for treating these signs as linear writing is found in two inscriptions on spindle whorls unearthed at Jela. These spindle whorls are referred to (after the catalogue of Winn 1981) as Jela 1 and Jela 2 and are reproduced here in **Figure 1** (overleaf).

Rotating Jela 2 one eighth turn clockwise, we see that the two inscriptions are virtually identical, with the only difference being in the uppermost sign—three ‘parallel’ (which is to say nonintersecting) lines on the right-hand view of Jela 1 and four on Jela 2. Arbitrarily proceeding counterclockwise from the first sign adjacent to this difference, we can enumerate the following as viewed from the outer edge of the whorls:

1. One line with three parallel lines coming off perpendicularly
2. Two parallel lines
3. Three parallel lines
4. Two parallel lines
5. One line with three parallel lines coming off perpendicularly
6. A number of parallel lines greater than two

Adjusting for the differences in ‘penmanship’, we can suggest an idealized representation of these signs in the order listed as in **Figure 2** (overleaf).

For the the sake of simplicity, let us refer to the signs represented as 1 and 5 as sign {1}, those represented as 2 and 4 (and possibly part of 6) as sign {2}, and that represented in 3 as sign {3}.

While a complete reiteration of the arguments for interpreting these inscriptions as linear writing would carry us far afield and would take us beyond the time and space limitations of this presentation, let us briefly summarize the arguments as follows:

1. Design. The inscriptions are composed of design motifs, not of random line patterns. These motifs recur throughout the corpus.

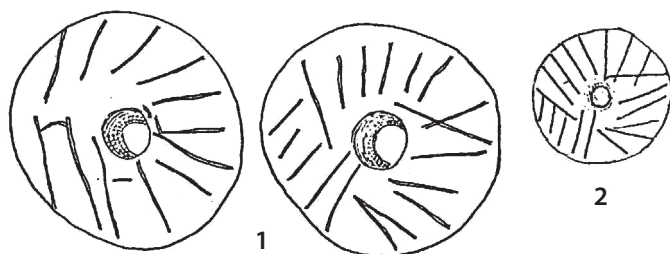


Figure 1. *Jela 1 and 2 (after Winn 1981:329).*



Figure 2. *Jela inscriptions.*

2. 'Penmanship'. The two inscriptions are identical enough to indicate that the differences in execution of signs between and within the inscriptions are consistent with the reasonable latitude expected in writing.
3. Repetition. Since the inscriptions are so identical, either the one is copied from the other or both reproduce an established sequence. Such a sequence is too complicated for a simple repetitive decoration and too simple and regular for a random line decoration.
4. Variation. Whether or not sign 6 was intended to vary in form or in content between the two inscriptions, both alternatives would suggest written language. Both involve the same ordering of elements in the same linear fashion and with the variation in the same location and within the same general class of design motif.
5. Grammar. Most importantly, all of these signs recur frequently on spindle whorls and also on other artifacts. That they should be placed in a particular order that is repeated in an identical context indicates the workings of a grammar.

With the Vinča script finally verified as writing, we can now attempt to determine the purpose of the script and even some limited decipherment. Most likely, the script is logographic in nature—an aspect recognized even before the linguistic nature of the signs was fully established (see Winn 1981; Haarman 1989, 1996).

2. THE RELIGIOUS PURPOSE. First of all, the use of the Vinča script in itself evidently had religious overtones. According to Winn (1981:253-54), one reason why the Vinča sign system may have stalled is that, rather than springing from a practical accounting system such as the one in Sumer (see Schmandt-Bessarat 1992), it was religious or ritual in nature (compare also Merlini 2002).

The fact that the inscriptions are on spindle whorls is also a good indication as to their religious purpose. As noted by Everson (1989—see also Haarmann 1996:24), weaving and objects related with weaving fall into a religious context in the Old European culture, as seen in their recurrence in folk tales and myths.

The religious nature of weaving and of spindle whorls in particular was either adopted by or shared with the Indo-Europeans. For example, the Greek goddess Artemis (to whom we return in the conclusion) was considered to be the Weaver of Destiny, and appropriate artifacts have been found in her shrines (Baring & Cashford 1993:323).

According to Gimbutas (1982, 1991), the religion of Old Europe included several feminine deities. In the main, these deities were theriomorphic—associated with animals and often represented in the artifacts as animals, as hybrid animal-human forms, or as human figures with animal masks. While no claim is proffered here for a ‘Goddess’ religion *per se* (compare Tringham & Conkey 1998), the artistic renditions and further research in progress do confirm that the deities involved in this study were considered to be feminine.

Thus, it appears most likely that the inscriptions on Jela 1 and 2 were religious in nature. Accordingly, we should expect them to make reference to one or more members of the Old European pantheon of animal-related deities.

3. ATTEMPTING A DECIPHERMENT. The methodology for deciphering the Jela spindle whorls is rather clearly suggested in their religious purpose. We should examine identifiable animal and animal-goddess figurines to establish connections between the signs enumerated above and those on the figurines.

Unfortunately, relatively few of the figurines are included in Winn’s corpus, in spite of the fact that there are a great many with apparently nonlinguistic, religious symbols in Gimbutas’ corpora. The reasons for this disjunction probably include the facts that (1) the figurines in and of themselves were sufficiently evocative of the goddesses being portrayed, and (2) there were other design elements that imparted the identification of the deities. For example, if we were to find a Greek statue of a male figure with wings on his ankles and a caduceus in his hand, we could recognize it as a statue of the god Hermes. Since the identity would be obvious from the artistic ornament, there would be no reason to require that the name be written on it (compare Harrison 1922:268–69).

In Winn’s corpus, however, there are a few figurines that are associable in form with their particular deities and that do in fact bear Vinča signs found on Jela 1 and 2. One is a clear representation of a bear’s head or mask on Pločnik 2, shown here in **Figure 3** (overleaf).

While the lines under the eyes are a common design motif, the curious configuration of the ‘eyebrows’ is unique on figurines. Winn (1981:113) interpreted these as a rendition of his sign 24; but that sign is characterized by a long horizontal line with three parallel lines going up from the left-hand side and three parallel lines going down from the right-hand side—a rotating-type design. On Pločnik 2, both sets of

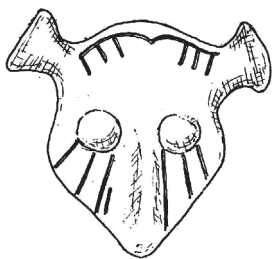


Figure 3. *Pločnik 2* (after Winn 1981:360).

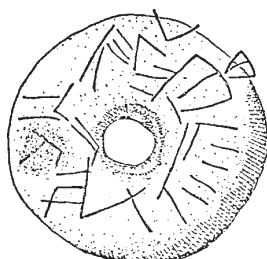


Figure 4. *Fafos 1* (after Winn 1981:320).



Figure 5. *Gomolava 1* (after Winn 1981:321).

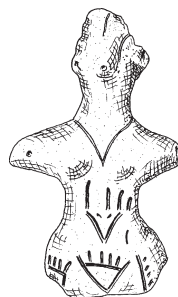


Figure 6. *Jablanica 1* (after Winn 1981:328).

parallel lines are going down—an arrangement also found on spindle whorl *Fafos 1*, as shown in **Figure 4**.

The eyebrows on *Pločnik 2* are more likely an artistic rendition of our sign {1}. This would provide us with a rather clear association between this sign and the bear. While this could be either a bear or the Bear Goddess, the rays descending from the eyes would suggest the latter (as these also appear on figurines of human heads). Moreover, the juxtaposition—twice—of this sign with sign {2} on *Jela 1* and *2*, suggests that the two parallel lines may be associated with the concept of a goddess.

Another figurine of interest is the bird-shaped head/mask of *Gomolava 1*, as shown in **Figure 5**.

Once again, we should note the ‘eyebrows’. Here we find an extended chevron, which is the mark of the Bird Goddess in the religious iconography catalogued by Gimbutas (1991:chapter 1). On the Bird Goddess’ neck, however, we find clear Vinča signs—the two parallel lines of sign {2} and the three parallel lines of sign {3}.

It is entirely possible that sign {3} is the sign for ‘bird’. Taken together with sign {2}, this would yield an appropriate inscription for the Bird Goddess. This sign also appears several times in a similar manner, but juxtaposed with a single line, on *Jablanica 1*, as shown in **Figure 6**.

It should be noted that the signs here occur between the chevron ‘necklace’ and the abdominal ‘beak’-shaped chevron with ‘eyes/nostrils’—both very well attested religious symbols for the Bird Goddess (Gimbutas 1991:chapter 1). They also occur

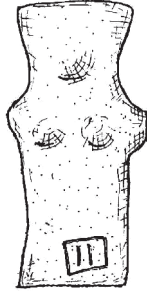


Figure 7. *Matejsky Brod 1 (after Winn 1981:348).*

surrounding the pubic region, highly and appropriately suggestive of a fertility goddess. Indeed, from a number of other realizations in the art, it appears that the single line may well prove to be a variant of sign {2}.

Once again, sign {2} on Jela 1 and 2 would appear to be the sign for ‘goddess’. Such an interpretation would stand to reason, since both sign {1} and sign {3} are juxtaposed with this sign in a religious context. What we need, though, is a clear rendition of sign {2} as an indication of ‘goddess’ by itself.

This rendition is found on Matejsky Brod 1, shown here in **Figure 7**.

From the shape, we can tell that Matejsky Brod 1 represents a female form. In the context of the Vinča culture, moreover, it is most likely the form of a goddess not associable (at least in this context and condition) with a particular animal.

In the lower right-hand portion of the obverse of this sculpture, we find our two vertical lines enclosed within a rectangle. While one might argue that this is a representation of the pubic region, the position is wrong, as is the enclosing shape—a rectangle rather than the triangle found in every other such case (as in **Figure 6**). This rectangle is most likely a device used to outline the sign, perhaps for emphasis.

That the rectangle should be used for isolation and emphasis rather than in the writing system *per se* is clear from the fact that the Vinča script is in all other cases linear (Haarmann 1996:42, 82). Thus, this would most likely not be a case of ‘embedding’, in which sign {2} is placed within a sign in the form of a rectangle in order to create a phrase.

The use of such an enclosing device is reminiscent of the Egyptian cartouche, used to isolate the name of a deity or of a sovereign (in effect, also a deity). Of course, it would be the wildest of speculations to suggest that the Old European practice may have influenced the Egyptian. Nor would such a suggestion be necessary, for the concept of using some oblong or rectangular enclosure to isolate and emphasize the name of a deity should hardly require the invocation of intercultural influence.

It is suggested, then, that the two parallel lines of sign {2} do indeed represent the sign for ‘goddess’. Given the lack of any other signs, the isolation and emphasis of this sign, and the physical nature of the figurine, such an interpretation is highly



Figure 8. *Tordos 12* (Winn 1981:269).



Figure 9. *Bird Goddess* (after Gimbutas 1991:8).

Sign	Form	Meaning
{1}	𐌿	bear
{2}		goddess
{3}		bird

Table 1. *Tentative decipherments.*

probable. Moreover, the isolated sign does occur prominently on spindle whorls, such as *Tordos 12*, in **Figure 8**.

5. CONCLUSION. If these associations are correct, then we should have a tentative decipherment for three Vinča signs, as shown in **Table 1**.

From an iconic point of view, the signs may well have developed in keeping with images that we might expect in the Old European ritual context. Sign {1} may have originated as the side-view of a bear’s arm and claw; and the positioning of the sign both on *Pločnik 2* and on *Fafos 1* would further support this interpretation, apparently representing both arms of the Bear Goddess in a posture of embrace. Sign {2} is frequently attested in the art of the region as a representation of the vulva, as is the variant. And in sign {3} we can recognize the Bird Goddess in her familiar epiphany position, with arms/wings raised up parallel to her head, as we see quite graphically in **Figure 9** (Gimbutas 1991:8).

Moreover, we can take the extra two parallel lines in the uppermost sign of *Jela 2*—which appears to be the more careful rendition—as forming some sort of emphasis, completion, or boundary, possibly in the form of a reduplication, as suggested for this sign by Newberry (1988:14). It is then possible to arrive at a rough decipherment of the message as a whole. Fortuitously, this message is the same regardless of the direction in which we read the whorl and regardless of whether this was a modifier-head language or a head-modifier language. In fact, it does not even matter if two of the parallel lines at the top are paired with the sign on one side or with the sign on the other. Finally, the inscription is simple enough that it could well have been some kind of religious mantra:

{1}	{2}	{3}	{2}	{1}	{2}	+	2}
BEAR	GODDESS	BIRD	GODDESS	BEAR	GODDESS		INDEED/AMEN/END

When we take into consideration the history of religion in the area, this interpretation actually makes quite a bit of sense. While the Bird Goddess and the Bear Goddess were separate entities early on, by the time the Old European pantheon was absorbed into the Indo-European, the two deities had merged. Thus, as we see below, the combination ultimately came to be realized as a single goddess in the Greek pantheon. With its readability in either direction, the inscription thus appears to be making an appropriate religious statement: ‘The Bear Goddess and the Bird Goddess are the Bear Goddess indeed’.

Basically the same reading can be achieved from Jela 1 with its three parallel lines. If these lines represent ‘bird’, then we have the two goddesses stated in full along with a juxtaposition of their animals, which could represent a coalescence as well. However, the three lines—as two plus one—would more likely be an emphatic ‘semi-reduplication’, a reduplication with the variant, an haplology, or a division, yielding precisely the same reading as for Jela 2 above. In these cases, Jela 1 would represent not an error in writing, but a simple variant in orthography—certainly the solution preferred by the linguist in the absence of a standard.

Supporting this hypothesis is the fact that millennia later, the single goddess Artemis would possess all three important attributes:

In the passage of the centuries many traditions of experience converged on her, and the figure whom the Greeks knew as Artemis carried memories from Neolithic Old Europe, Anatolia and Minoan Crete. The Old European Bear Goddess, Bird Goddess and the Weaving Goddess of the spindlewhorls can be rediscovered in the stories and images that surround her, and in the kind of festivals that were held in her honour. Spindles and loom weights were found in many of her shrines, and on Corinthian vases she holds the spindle of destiny as the weaver of the interlocking web of animal and human life. (Barling & Cashford 1993:323)

While confirming the future Greek identity of the goddess at issue would be interesting (and this is being done in a work in progress), the important point here is that such a confluence of attributes did exist in the figure inherited from the Old European culture. Since we know from this cultural context that there had been a coalescence of the three salient attributes represented in Jela 1 and 2—bear, bird, and spindle whorl—the contextual framework of these artifacts certainly supports the interpretation suggested here. Of course, we shall have to examine future findings as they become available in order either to corroborate this hypothesis or to challenge it.

In either case though, *we have a sound methodology in the form of a testable hypothesis*. Now that it is clear that we are dealing with writing, we must correlate symbols with identifiable contextual frameworks. In the absence of contemporary writing

systems, it is the physical and cultural contexts that will provide us with the 'Rosetta Stone' that will, with perseverance, lead us to whatever decipherments of the Vinča script we may be able to achieve.

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THE HISTORICAL RECONSTRUCTION OF COGNITIVE MODELS: AMOR IN BERNART DE VENTADORN

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FEW WOULD DENY THE IMPORTANCE OF THE IDEA OF 'LOVE' in modern Western civilization. In its various forms, it plays a key role in the Christian ideology so fundamental to Western thought, in the emotional structure of family life, and in the varied forms of literature issuing from Western imagination. Yet it is now widely recognized that 'love', far from being an emotional state arising purely from biology, is a culturally constructed 'emotion concept' which interweaves simple biological drives with a vast complex of cultural ideas and expectations and is as much the product of a particular cultural system as is religion, art, or social practices. New readers of ancient and oriental literatures are often surprised at the absence of this concept or the radically different ways it is conceived. Readers of ancient Chinese poetry will look in vain for 'love poetry' as it exists in our culture, as will readers of classical Roman poetry be surprised at the rather carnal slant ancient writers invariably impose upon it.

It has become a truism of Romance studies that the modern romantic concept of love was a product of the 12th century. This statement will be found in various places in the literature on what has come to be called 'courtly love' since Gaston Paris coined the term *amour courtois* in the late 19th century. There is some truth to the statement, but those who know the lyrical works of the 12th century know that the concept of '*fin' amor*' which appears for the first time in the works of the Provençal troubadours is something different from the more familiar 'amour courtois' formed when it was alloyed with Christian ideology in northern France, and even more remote from the modern concept of 'romantic love' which developed even later by a gradual linkage with the practices of courtship and marriage. This being said, there does seem to have been some continuity between these various concepts, so that '*fin' amor*' may be considered the germinal form of an 'emotion concept' which was to play a very central role in Western literature and civilization.

The idea of the emotion concept is actually of fairly recent origin. It emerged from studies in psychology and linguistics done in the last decades of the 20th century when the strong shaping effect of culture on emotion began to be realized¹. For the study of literature, perhaps the most useful approach was that developed by Zoltán Kövecses in a series of works from 1986 to 2000, using the metaphors used for discussing emotions as tools for analysing the inherent structure of the emotion concepts underlying them. Fortunately for the present work, the emotion that Kövecses studied most intensively was the emotion of 'love' as it is represented in modern conversational American English. In his book specifically devoted to this topic, *The Language of Love* (1988), he

explores the great variety of concrete metaphors used to discuss the abstract concept of love: love as a fluid, a fire, a natural phenomenon, a physical force, magic, insanity, rapture, a hidden object, an opponent, a captive animal, and various analogies to the practices of war, hunting, fishing, and game playing. According to Kövecses, most languages lack an adequate vocabulary specifically dedicated to the discussion of abstract concepts, such as emotions, and so make use of metaphors extended from the realm of concrete experience. The particular choice of metaphors a culture makes, he argues, can give a good indication of how that culture constructs the emotion in question. As can be seen from the example metaphors for 'love' listed above, the emotion concept is often a rich and complex one.

Though as a linguist of modern English, Kövecses naturally focused his attention on colloquial North American, the methods he developed can be used to study emotion concepts in all times and places where we have an adequate body of linguistic material from which the metaphors may be extracted. Thus the idea was conceived of using his methods to study the germinal form of the Western 'romantic love' concept, the *fin' amor* of the troubadours, to see in what ways it differs from the modern concept which was to follow it. This is highly desirable, because if one looks over the scholarly literature on courtly love that has appeared over the last century, one notices that the primary focus of such studies is most often the ideology and social custom associated with it. The emotions experienced by the participants figure much less prominently, yet it is these very emotions which are the main topic of the lyrical writings of the troubadours.

Where one finds some of the best systematic treatments of troubadour emotions is in the studies of the special vocabularies used in their writings: on the concept of *fin' amor* itself, on the vocabulary of suffering, the special terms *joi*, *joven*, and *mezura*². These studies all use instances of these terms in context to determine what they really meant to the poets who used them and the audiences they composed for. This approach is a useful remedy for one of the dangers of reading works from centuries far removed in time from our own, namely, a tendency to assume modern meanings for terms ancestral to modern terms, when the probability of semantic change over all that time is extremely high. Thus, terms for emotion concepts, such as what is implied by the troubadours' use of the word *amor*, can often be overlooked for the simple reason that we assume we know what the term means, but really have no good reasons for making that assumption. All the attention devoted to determining the meaning of *fin' amor* can seem rather pointless if we are unclear on the meaning of the simple term *amor* which forms part of it.

The present study is part of a larger project to research the evolution of the meaning of the term *amor* over the period of the troubadour movement from 1100 to 1300, using the methods devised by Kövecses. The present study focuses on the works of Bernart de Ventadorn, and will do so for several reasons. He was the first troubadour to use the word extensively, partly because all of his works are devoted to the subject and partly because he loved the word, in some places repeating it line after line. In contrast, his contemporary Raimbaut d' Aurenga used it rarely, though he wrote

primarily on the same subject. Bernart was also the most widely reproduced of the early troubadours, some of his songs being found in a large proportion of song collections, indicating that he had a strong influence on succeeding generations. For these reasons, of all the early troubadours, Bernart could be argued to have had more influence on the semantic evolution of the term *amor* than anyone else. He was thus in a crucial position to participate in the cultural construction of this important emotion concept³.

The research strategy used was to examine all 167 instances of the use of *amor* in the 43 songs which have come down to us, determining the noun's grammatical function in each instance, and the number of predications in which it functions. A subject noun may, for example, serve as the subject of several subsequent verbs. There are also a handful of cases in which the noun *amor* has been replaced by a pronoun, which in turn participates in a predication. In all, the word *amor* participates in 200 predications in Bernart's works. The next step was to study each predication to determine whether it could be considered 'metaphorical', and then to classify the metaphors discovered into semantic categories. The result is a metaphorical profile of the emotion concept attached to the word *à la* Kövecses.

Like any noun, the word *amor* can participate in only a limited number of grammatical constructions: subject of an active or stative verb, direct or indirect object, and object of a preposition⁴. It was found that the frequency of metaphorical usage differs radically among these possible grammatical functions. The function of subject of an active verb tends to force a metaphorical usage upon the verb with which it is predicated since it puts the abstract concept *amor* into an agentive function, which it cannot perform without the use of a metaphor drawn from an inventory of concrete agents. The function of direct object tends to have the same effect, since it casts *amor* into the role of patient, something upon which something is done, and the verb with which it is predicated must be a verb describing an action, once again concrete. Frequency of metaphor in the other functions is much lower, since the more abstract functions tend to be more compatible with an abstract noun, i.e. subject of a stative verb and object of a preposition (though some prepositions tend to encourage metaphor, e.g. *vas amor* 'towards love').

By far the richest variety of metaphors occurs when *amor* performs the grammatical function of subject of an active verb. Old Occitan, like many other languages, depended on the metaphorical extension of verbs describing physical actions to provide verbal predicates for abstract subject nouns. This phenomenon is complicated, however, by a complementary process involving the concretization of the abstract noun known in the literature as 'personification.'

Personification, first described for the troubadour writings by Jeanroy (1934) and later extensively treated by Schnell (1985), is a process whereby an abstract quality is represented in human form, as was often done in antiquity by embodying it in the form of a god. The abstract quality can then be referred to and even addressed as if it were a human being. In the Roman poets, such as Ovid, who had the strongest influence on the troubadours, the Latin word *Amor* is, in fact, an alternative name for Cupid. Thus,

we occasionally find the Old Occitan word *Amor* capitalized by the editor in some transcriptions of troubadour songs (though often according to no predictable pattern), and we do occasionally find *Amor* directly addressed as if in prayer:

- (1) Per Deu, **Amors**! be-m *trobas* vensedor,
ab paucs d'amics e ses autre senhor. (39:13–14)

'For God's sake, **Love**, you *find* me indefensible—
with few friends and no other lord.'

However, true personifications such as this one are actually not very common in Bernart's works, and even in those that do occur, it is the abstract quality 'love' that is addressed, and not the god Cupid, as is made clear in the illustration above by the interjected *per Deu*, which precludes a pagan interpretation.

Verbs used metaphorically with a subject *amor* were found to fall into a number of semantic categories. In order of frequency, they were metaphors of: captivity (14), assault (9), fragility (8), conquest (6), volition (6), and observation (5), with the remaining 10 cases distributed among a wide variety of remaining semantic categories. Each of these will be discussed in turn.

Of the metaphors of captivity, the most frequent predicate applied to *amor* is the verb *tener* 'hold':

- (2) e ges per so no-m posc partir un dorn,
aissi-m *te pres* s'**amors** e m'*aliama* (12:13–14)

'And I cannot break away by a hair's breadth,
so close does her **love** *hold* me and *bind* me.'

This particular example is particularly rich in that *tener* (*te*) is found with the term *prendre* 'take' and another predicate of captivity, *aliamar* 'bind.' The verb *tener* is also found in 4:14, 5:11, 7:11, 12:15 and 17:2. Other metaphors of captivity are the verbs *lasar* 'bind' 17:2, 22:51; *enliamar* 'bind' 3:42; *enpreizonar* 'imprison' 9:17; *asolar* 'free' 27:66; *prendre* in the sense of 'capture' 31:21; and the more complex expression *metre en las charcers* 'put in jail' 31:22.

Bernart's metaphors of assault are particularly striking, and include all concepts relating to hurting, killing, and intimidating. The choice of the term 'assault' is based upon the following example:

- (3) c'**amors** m'*asalh* que-m sobresenhoreya
e-m fai amar cal que-lh plass' e voler. (42:11–12)

'Since love *assails* me and lords it over me,
making me love and desire whomever he pleases.'

Other predicates in this category are *aucire* 'kill' 10:10, 17:31; *dissendre* 'strike' 4:25; *aturar* 'attack' 8:13; *ferir* 'wound' 31:25; *far dolar* 'cause to suffer' 27:34; *far trassalhir* 'cause to tremble' 13:19; and *donar mals trailhz* 'give mistreatment' 23:5.

The metaphors of fragility are in stark contrast to the much more common aggressive metaphors and imply a transience and fragility to the state of *amor*:

- (4) Ges **amors** no-s *franh* per ira
ni se *fenh* per diu savai
can es de bo pretz verai. (18:8–10)

'Love, when it is truly worthy,
is not *shattered* by anger
nor *diminished* by harsh words.'

In this case, the fragility metaphor is expressed twice, with the two separate verbs *franh* and *fenh*, and is stated in the negative, but more commonly, it is positive. Other fragility predicates are *dechazer* 'be overthrown' 7:21, 15:17; *no remaner* 'not remain' 21:13, 42:20; *durar* 'last' 19:46; and *mudar so coratge* 'change his mind' 8:13.

Allied semantically to the metaphors of captivity and assault are the metaphors of conquest and domination, in most cases expressed using the transitive verb *vencer* 'conquer':

- (5) e per **Amor** sui si apoderatz,
tot m'a *vencut* a forsa ses batalha. (35:5–6)

'I am completely overcome by **love**,
who *conquered* me by force without a struggle.'

This is a particularly good example of personification, the implication of animacy in the subject noun *Amor*, which was capitalized by the editor as a proper noun. *Vencer* appears as well in 4:45 and 5:19. Other verbs of conquest are *forsar* 'force' 4:46; *sobre-senhoreyar* 'lord over' 42:11; and *capdolhar* 'dominate' 42:21.

Another characteristic attributed to *amor* by the metaphorical use of active verbs is volition or desire, in most cases expressed by the verb *voler* 'want':

- (6) c'**amors** se *vol* soven servir (14:27)
'For **love** *wants* constant service.'

Other uses of *voler* are 27:9, 29:13 and 42:16. Other verbs in the category of volition are *segre* 'follow' 29:45 and *enchausar* 'shun' 29:46.

The remaining semantic category is that of observation and includes a variety of verbs implying attention or consciousness:

- (7) e no ve c'**amors** lh'*atenda*. (26:14)
And does not notice whether **love** is really *paying any attention* to it.

Other verbs in this category are *ir segon* 'be concerned with' 10:35; *amar* 'be interested in' 15:21; *oblidar* 'forget' 23:17; and the phrase *metre sa cura* 'direct his attention' 8:16.

The remaining ten examples of *amor* in use as subject of an active verb are scattered among a variety of unrelated semantic categories: *enamorar* 'cause to love' 3:25; *dar non plazers* 'give no pleasure' 3:27; *saber guizado rendre* 'know how to reward' 4:27; *eschazer* 'befall' 7:53; 10:9; *far* in the sense of 'labour' 8:25; *pertraire* 'prepare' 8:26; *a lo nom* 'have the name' 15:20; *far amar* 'cause to love' 35:10; and *asegurar* 'protect' 44:15.

The examples above account for all of Bernart's uses of the word *amor* as the subject of an active verb, and it is interesting to note that all but the last ten, or 87% of them, fall into six clear semantic categories. It is even more interesting that a full 50% of his uses fall into one of the three aggressive categories: captivity, assault and conquest. Moreover, only once do we find a metaphor implying kindness or gentleness, viz., *asegurar* 'protect'. Clearly, for Bernart love is a powerful and threatening force over which he has no control. Love wants, and observes, then it strikes, captures, and conquers (though its conquest may be impermanent), and these metaphors account for nearly everything that love does.

We turn our attention now to the other major grammatical function performed by *amor* that involves a high incidence of metaphor, that of direct object. However, unlike the function of subject of an active verb, which is treated with metaphors in a variety of semantic categories, there seems to be one overriding metaphor complex which dominates the word in this grammatical function, viz., a commodity metaphor where love is treated as a valuable object or substance that is desired (7), given (6), received (3), possessed (3) and enjoyed (3).

The metaphor of highest prevalence is the metaphor of desiring, as in the following:

- (8) car aitan rich'**amor** *envei*,
pro n'ai de sola l'enveya. (7:39–40)

'Since I *desire* such a rich **love**,
the desire itself is a reward.'

Enveyar is also used in 42:32. We also find *voler* 'want' in 27:9 and 30:56; *asire en tan aut loc* 'place so high' in 35:27; *agra* 'shall have' in 37:43; and *chauzir* 'choose' in 38:8. Note here that it is the poet doing the desiring, and it is clearly the love to be given by the lady that he desires.

Next most prevalent is the metaphor of giving:

- (9) una domna-m *det* s'**amor**
c'ai amada lonjamen, (6:3–4)

'A woman whom I have loved a long time
gave me her **love**.'

It is notable that in all instances of the giving metaphor, it is the lady giving her love to the poet. The simple verb *dar* is used in two other cases: 7:42 and 13:17; *autreyar* 'grant' is also used in two: 7:15 and 40:14; while *faire* is used in one case with the meaning 'grant': 28:29.

Receiving, the converse of giving, also occurs, as we might expect:

- (10) S'**amor** *colh*, qui m'enpreizona,
per lei que mala preizo... me fai, (9:17–18)

'I *embrace* **love**, which imprisons me,
for the sake of her who fashions my dreadful prison.'

Colhir 'gather' is used also in 9:16, while *tolhir* 'take' occurs in 27:25.

Possession is typically expressed by the simple verb *aver* 'have':

- (11) Anc no vitz ome tan antic,
si a bon' **amor** ni pura (24:41–42)

'You never saw a man so old that,
if he *has* a good and pure **love**...'

Aver is also used in 42:6; while *portar* 'carry' is used in 41:15.

Finally, the enjoyment of love, once possessed, is the remaining metaphor:

- (12) qu'eu agra **amor** *jauzida*
si no foso lauzenger. (23:51–52)

'For I would have *enjoyed* **love**
if there had been no slanderers.'

Also found is *vanar* 'boast about' in 22:21; and *blasmar* 'criticize', a negative form, in 15:15.

An overall examination of this commodity metaphor complex indicates that *amor* is desired by the poet, given by the lady, and received, possessed and enjoyed by the poet, once given. Interestingly, this metaphor complex is something entirely different from the metaphors used with *amor* as subject of an active verb, indicating perhaps a separate emotion concept only loosely connected with the first. Clearly, in its role as patient, *amor* is perceived very differently than in its role as agent. In this case, the focus is on the love of the lady, something which she can grant or withhold according to her whim.

As mentioned in the beginning, metaphorical usages are much less common in the grammatical functions of subject of the stative verb and object of a preposition, though a few do occur in the latter.

Amor as subject of a stative verb, typically the copulative verb *esser* 'be', usually involves a predicate with an evaluative function such as in:

- (13) Aissi com es l'**amors** sobrana
per que mos cors melhur' e sana, (22:5–6)

'Just as the **love** in which
my heart is improved and cured *is superior*...'

Positive and negative evaluations of this sort are found in nearly all stative uses but involve no metaphor: 3:35, 4:1, 4:35, 10:8, 15:4, 15:18, 15:19, 15:29, 18:8, 22:9 and 22:22.

The grammatical function of object of a preposition also rarely involves metaphor, though there are some exceptions. When, as object of the preposition *de* 'of', the prepositional phrase performs the function of a partitive object, the commodity metaphor is usually present, as in:

- (14) no serai jauzire
de leis ni *de* s'**amor**. (25:47–48)

'I shall *enjoy*
neither her nor her **love**'

We even find the assault metaphor in cases where the prepositional phrase implies an agentive function:

- (15) mas eu non ai ges poder
que-m posca d'**Amor** defendre (4:23–24)

'But I do not have the strength
to *defend* myself against **love**.'

The same thing can happen with the preposition *ab* 'with':

- (16) *Ab* **Amor** m'èr a contendre,
que no m'èn posc estener, (4:17–18)

'I must *struggle with* **love**,
since I cannot keep away from it.'

The preposition *enves* 'against' seems always to imply this metaphor:

- (17) que nuls om no pot ni auza
 enves **Amor** contrastar. (4:43–44)

‘For no man can, or dares,
 oppose **love**.’

A similar use is found in 10:8.

Many prepositional phrases with the preposition *per* ‘by’ imply agentive function and are accompanied by the assault metaphor:

- (18) car eu sai be que *per amor* morrai. (10:7)
 ‘For I know that I will surely *die of love*.’

The same verb is used in 17:36.

The conquest metaphor appears as well in the following:

- (19) e *per Amor* sui si *apoderatz*, (35:5)
 ‘I am completely *overcome by love*.’

Finally, as mentioned earlier, a locative metaphor is implied by all cases of prepositional phrases with the preposition *vas* ‘toward’:

- (20) si-m *tira vas amor* lo fres
 que vas outra part no m aten. (31:7–8)

‘The rein so *draws me toward love*
 that I turn my attention nowhere else.’

Other occurrences of this are 23:11 and 31:3.

When one compares the conceptual structure of Bernart’s *amor* with that of the modern American ‘love’ of Kövecses, one cannot help but realize that we are dealing with very different concepts, since the overlap in metaphorical uses is so minimal. This should be no surprise since they are words from different languages, from different geographical areas and separated by eight centuries of history.

In contrast to our modern concept, which ranges over many disparate metaphors, Bernart’s is comparatively more compact and well defined, yet bifurcated into two distinct concepts according to gender. For the male poet, *amor* is conceived in the role of a predator or conqueror that assails him against his will. It is widely known that the focus of troubadour poetry is on the poet and his suffering on account of love, and this comes out very clearly in the metaphors Bernart chooses. His reputed sincerity may well have come from his use of his own personal suffering as a springboard for inspiration, which is quite possible considering the high status of the ladies he

loved. For himself as a man, love was an affliction, while for the lady he courted it was by no means that, but rather a favour she could dispense or not dispense.

It would be best, when we translate or even read *amor* as 'love', to avoid bringing to our translation or reading the conceptual structure of our own language and milieu. Avoiding this pitfall, however, requires a constant struggle, first to discover the concept attached at the time to the term used, and then to install that concept in our own minds as part of our knowledge of the period in which the work was written. We can then bring this knowledge to our translation or reading in the hope of minimizing the distortion of our understanding caused by the influence of concepts of love that were developed later, and which we must therefore look upon as irrelevant.

- ¹ A good summary of this literature (up to its publication date), and the book that most influenced Kövecses, is Branden 1983.
- ² Some notable studies of courtly love are those of Denomy 1953, Frappier 1973, Lazar 1964, and Schnell 1989. Schnell 1985 contains an extensive inventory and comparison of works in the topic. Lavis 1972 covers broadly the vocabulary of affect, including a brief discussion of *amour*. A thorough treatment of the vocabulary of suffering, specifically that used by Bernart de Ventadorn, is Bec 1969. Repentance in medieval French literature generally is discussed at length in Payen 1967. Camproux 1965 devotes a whole book to the concept of *joi* as understood by the troubadours. Denomy discusses *fin'amors* (1945), *joven* (1949), and *joi* (1951) in a series of separate articles devoted to troubadour vocabulary.
- ³ The texts used were those of Appel 1915, as reproduced in Nichols et al. 1965, and the system of numbering of songs and lines is that of Appel as adopted in the latter work. The first number is Appel's number for the song referred to; the following numbers indicate either the lines quoted or the line in which a mentioned word occurs. In Occitan texts, dots are used to separate enclitics from the words to which they are attached, and apostrophes are used for proclitics. Translations of quoted passages are taken from Nichols et al. as are translations of individual terms, which are according to their meanings in context, not their base meanings.
- ⁴ *Amor* as an indirect object is not found in Bernart's works, and neither are some rarer adverbial functions performed by nouns.

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ON THE USE AND MISUSE OF LANGUAGE AND THOUGHT: MAX
STIRNER'S (1806–1856) *DER EINZIGE UND SEIN EIGENTUM*

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IN 1928, THE AUSTRIAN COMPOSER ANTON VON WEBERN (1883–1945) defined art as ‘the faculty to present a thought in the clearest, simplest, that is, most “graspable” form’ (*die Fähigkeit, einen Gedanken in die klarste, einfachste, das heisst fasslichste Form zu bringen*) (Webern 1959:10). Senft (1988:1) uses this definition for evaluating Max Stirner’s *Der Einzige und sein Eigentum* (*The Ego and his Own*) as being ‘not just a classic of socialist literature—it is also a piece of art’ (*nicht nur ein Klassiker der sozialistischen Literatur—es ist auch ein Kunstwerk*).

The reaction to such an assessment was in the past and still is at the present time divided into pronouncements stemming from two extreme positions. Ever since the book was first published in 1845 there has been a sizeable group who enthusiastically expressed agreement. And there were, as there are still today, numerous opponents who love to hate almost every portion of Stirner’s book.

Both sides, however, agree that Stirner (actually a pseudonym for Johann Caspar Schmidt), with his only major publication, exerted an extraordinary influence, in Germany as well as in many other countries—an influence reflected, for instance, in the large number of writings on Stirner and on his book: well over 1000 items, as Helms (1966) has documented, a number that has continued to grow since then.

Amazing as this may be, even more surprising is the fact that there is not a single book—and to my knowledge not even a single article—which deals exclusively with Stirner’s use of language. We will see that there are of course some isolated remarks here and there, and there is even a single chapter’s discussion of how Stirner deals with language (Helms 1966:184–223). But while a large number of writers seem to agree that Stirner’s language has a great deal to do with the astounding impact of his monumental work, to date no attempt has been made to come up with an analysis based solely on linguistic criteria.

Stirner’s work is meticulously planned. There is no mere muscle-flexing to demonstrate that he knows how to aim high, no empty frolicking for momentary amusement’s sake. Stirner is dead-serious in what he sets out to achieve, and he is well aware of the crucial role that language plays in pursuing his objectives. On the other hand, he is adamant in his belief that language, as it exists, is not up to the task he thinks it should or even must fulfill. Language needs to be radically reformed. Word and thought, he demands, must be cut loose from their time-honored entrapment over many centuries arising from their use by the wrong type of people and must be re-defined for the use of the single individual: the I, the Ego, the Self.

As of now, he claims, we are prevented from thinking, since we are confronted with a myriad of ideas pre-thought for us and codified in words, and there is for us no escape from them. Instead of the individual determining the thought process by unrestricted thinking, the thought process is determined for the individual by his being inescapably exposed to words codified as a result of ideas thought of by people from other times and for reasons that may be vastly different from his own. Stirner frequently speaks of 'fixed ideas', which, according to him, must all be destroyed. Only after the destruction of those fixed ideas will the individual be entirely free, hence capable of thinking truly creative thoughts, in accordance with only his own needs and desires. But alas, the 'language dead' do not really die; they outlive their originators, live on as ideas, and continue to dominate the thought processes of the individual today. (Cf. Mauthner 1923:327 and 2003.)

At first sight, such an attitude sounds not only quite reasonable and attractive, but even outright fascinating. Why should we be held under the sway of thoughts produced by thinkers who died perhaps centuries ago? Should we not fully exploit our language ability to achieve the maximally creative production of thoughts resulting in the formulation of words which carry only that type of meaning bestowed on them by our own, uniquely individual thought? Well, that is wishful thinking on the part of Stirner! The absurdity of his position is easily exposed. But let me briefly refer to those portions of Stirner's views which in this connection are fully acceptable. 'No empty word-shells' is one of his recurring demands. He wants to ferret out and destroy ideas, presumably godlike or god-inspired ideas, which for him are false gods, *Götzen*. Some of these ideas are indeed what he claims them to be, *Götzen*. They deserve to be tossed out, and he should be applauded for his endeavor in this regard. But his objective is not only directed against potential misuse; it is all-comprehensive. For him each and every idea, as an abstraction, is non-physical, hence contrary to the purely physical needs of the individual. All ideas for him are fixed ideas (cf. Stirner 1972: 46, 47, 51 et passim) coined—according to his belief—by others for the sole purpose of dominating their fellow-men. This unquestionably involves numerous and complex philosophical aspects of Stirner's position, which must of course be disregarded here. But also involved are crucial, far-reaching, purely linguistic implications which we must focus on. Stirner aims at the total destruction of all concepts of our society, all moral, religious and any other values which in his view only serve one single purpose, restricting if not destroying the freedom of the individual, the I, the Ego, to decide by himself on all that matters to him.

Toward the end of the 19th century the uniqueness of the individual as a language user was established by the recognition that only for the individual's language can the claim of a concrete existence be upheld. A national language, as the sum total of the languages of all individuals, is in itself an abstraction. What Bernard Bloch had called idiolects (cf. Bloch 1948:3–46), were referred to as 'Individualsprachen', the language of individuals, by Hermann Paul in his *Prinzipien der Sprachwissenschaft* as early as the 1880s:

Gehen wir davon aus, dass es nur Individualsprachen gibt, so können wir sagen, dass in einem fort Sprachmischung stattfindet, sobald sich überhaupt zwei Individuen miteinander unterhalten. (Paul 1920[1880]:390)

If we start by assuming that individual languages are the only ones that have any real existence, we are justified in asserting that as soon as any two individuals converse, a mixture in language is the result. (English per Strong's translation—Paul 1970[1891]:456)

Yet the uniqueness of the individual's language does not mean that the languages of individuals are mutually unintelligible. After all, the units in each individual's language are—though not identical—similar enough to make mutual understanding almost perfectly possible and potentially to an almost perfect degree of sophistication.

But it is perfectly impossible to expect—as Stirner obviously does—that any type of understanding, of an individual and by an individual, can occur if that individual is bent on destroying all concepts formed over the centuries by speakers of a particular national language and handed down, more or less modified, from generation to generation. Stirner is most certainly conscious of what he does, and he also seems to know where this type of action will lead him: to the self-destruction of language.

As a remedy, he advises his readers to strive for *Gedankenlosigkeit* 'thoughtlessness' and *Sprachlosigkeit* 'speechlessness':

Und nur durch diese Gedankenlosigkeit, diese verkannte »Gedankenfreiheit« oder Freiheit vom Gedanken bist Du dein eigen. Erst von ihr aus gelangst Du dazu, die Sprache als dein Eigentum zu verbrauchen.

And only through this thoughtlessness, this misjudged 'freedom of thought' are you your own self. Only from here do you get to consume, use up, language as your own. (Stirner 1972:389)

Stirner uses in his book the term *Vernunft* 'reason' 76 times, according to my count, yet he cannot account by reason for how the individual's unique language, which by its uniqueness must be viewed as incompatible with the equally unique language of other individuals, could be a usable, let alone be a useful tool for an acceptable existence in human society. If language becomes the sole property of each individual speaker, no intercommunication can take place.

Equally inconceivable is Stirner's position that as an individual:

bist [Du] nicht etwa bloss im Schlafe, sondern selbst im tiefsten Nachdenken gedanken- und sprachlos, ja dann gerade am meisten.

you are not thoughtless and speechless merely in (say) sleep, but even in the deepest reflection; yes, precisely then most so. (ibid)

Two objections must be raised. One is that thought and language have no separate existence from one another. Thoughtless speech is speech severely impaired, and speechless thought is speech not yet uttered, is in *statu nascendi*, about to be born. If it remains unuttered, who knows about it? This brings me to the second objection. Stirner neglects to acknowledge that speech needs to be perceived by individuals other than the speaker in order to become objectively existent. He or any speaker may make whatever claim he likes as to what is in his mind. Yet only after 'he speaks his mind' does the world come to know what was in his mind, what thoughts he had entertained before he released them to the world at large via the words of language.

Looking at how Stirner deals with the historical aspect of language leads to strange results as well. On the one hand he eagerly elaborates on how in the course of history concepts were coined which did all the wrong things for freedom-loving people, enslaving them rather than bestowing on them the right to be their own. But on the other hand he fails to focus on what is in the very center of our language, of any language: the historical dimension of language development that involves myriads of generations over a span of thousands of years. Take that historical developmental dimension away, flatten that dimension to a time-line of no extension, and Mr. Stirner will have to start language from scratch, at pre-stone age time, perhaps barely as *Pithecanthropus erectus*, as already upright-walking ape-man.

I am very sure that Stirner was keenly aware of all that. He nevertheless argued the way he did, because he could hardly paint a better picture of the desperation and hopelessness he and a group of like-minded people thought they were trapped in than by conjuring up a real-life situation of immensely drastic implications. The book was meant to shock people out of their complacency and make them realize how terrible things could become without appropriate counter-measures. He leaves no doubt that relief, where it is possible, would have to be initiated by language, by creating concepts which could transform the world at large to become more responsive to the suffering individual's needs.

The Ego and his Own caught the fascination of a sizeable number of contemporary readers almost from the very day it first appeared in 1845. But after a few years Stirner was entirely forgotten. The interest in his book was rekindled at the turn of the 20th century and kept alive, this time for a few decades, by the efforts of his biographer, John Henry Mackay (1864–1933), but then total oblivion took over again. The third and still ongoing stage of resuscitation began in the early 1960s and has been by far the most wide-spread revival. Leaving aside the history of this rise and fall of interest in Stirner, we have to ask: to what extent was the amazing effect of the book due to its language, due to how Stirner, by design or accidentally, made use of the tool of language, the tool which he had singled out for destruction? That the effect was amazing, cannot be doubted, even though there is wide disagreement as to the type of people who were demonstrably affected. We need not subscribe to the almost boundless exaggerations that have surfaced and will continue to surface, such as Mackay's assertion that Stirner possessed 'den vielleicht klarsten und schärfsten Verstand

aller Zeiten und Völker' (*perhaps the clearest and sharpest intellect of all times and all people*) (Mackay 1914:22) and that:

...alle Bände aller Bibliotheken der Welt [Stirners Buch] nicht ersetzen könnten, wäre es verloren gegangen. Alles vor und nach ihm Gesagte erscheint demgegenüber so ziemlich überflüssig.

...all volumes of all libraries of the world could not replace [Stirner's book], if it had been lost. By comparison, everything said before or after him appears pretty superfluous. (Mackay 1932:85)

For Alfred Cless, the author of *Der Einzige und sein Eigentum* is 'der Weltreformer (von einer Bedeutung mindestens wie Luther)' (*the world reformer [of a status of at least that of Martin Luther]*) (Cless 1906:13). Helms's appraisal (1966:4), on the other hand, deserves to be taken more seriously: Stirner's influence proves to be 'als über jedes vorstellbare Mass hinausgehend' (*transcending every imaginable extent*).

Philosophers past and present are, in general, conspicuously silent. While Feuerbach (1804–1872) calls Stirner, in a letter written in 1844, 'the most ingenious and freest writer I've had the opportunity to know' (cf. Gordon 2003), there is no word on Stirner from Nietzsche (1844–1900), although many critics are convinced that he at least knew of the book's existence. Modern philosophers like Martin Heidegger and Jürgen Habermas do not go beyond some casual remarks, which is notably different from what political scientists have to say. We will, however, concentrate on our branch of scholarship. An assessment like the following by the literary historian Eduard Engel (1851–1939) is no rarity at all:

Geschrieben... ist es [das Buch], wie in Deutschland ungemein selten geschrieben wird: mit einer packenden Lebendigkeit, im ungekünstelten Gesprächstil und mit einer Sprachreinheit, die ans Wunderbare grenzt.

It [the book] is written, as one writes in Germany extremely rarely, with a stimulating liveliness, in an unaffected conversational style and with a purity of language that borders on the miraculous. (Engel 1907:1153)

That is surely an informative appraisal, yet hardly a useful analysis. Others have done better in this regard, but it needs to be repeated that to this very day no investigation exclusively devoted to Stirner's language use has been forthcoming.

Even those severely critical of him acknowledge his greatness as a writer. Thus, Hermann Schultheiss (1922:4) lets it be known:

dass ich Stirner um den Glorienschein... bringen werde; der Ruhm eines scharfen Kopfes und eines Meisters der Diktion kann ihm nicht geschmälert werden.

that I will put an end... to Stirner's glorification; the fame of being sharp-minded and a master of diction, however, can not be taken away from him.

Karl Marx (1818–1883) and Friedrich Engels (1820–1895) were among the first who read the book and wrote about it. And they had a great deal to say about it in their bulky *German Ideology* (cf. especially pages 119–542), including a great deal about its language. They condemn almost every aspect of Stirner's work and do it with sarcastic, if not outright vitriolic, eagerness. Here two examples.

First:

The emptiest, shallowest brain among the philosophers had to 'end' philosophy by proclaiming his lack of thought to be the end of philosophy and thus the triumphant entry into 'corporeal' life. His philosophising mental vacuity was already in itself the end of philosophy, just as his unspeakable language was the end of all language (Marx & Engels 1976:449).

Second:

The 'special' thing that Sancho (= Stirner) does in his *Commentary*... consists in his regaling us with a new series of variations on the familiar themes already played with such long-winded monotony in 'the book'. Here Sancho's music, which like that of the Indian priests of Vishnu knows only one note, is played a few registers higher. But its narcotic effect remains, of course, the same (ibid:445).

The two authors, who both had come to know Stirner briefly before the book was published, must have been greatly affected by it, and probably not only in a negative way. Otherwise, why would they have spent that much time and energy on refuting it? Their critical account could not have had any impact on the first two stages of the Stirner reception, since for some reason it was published only in 1903 by Eduard Bernstein (1850–1932), that is, after the death of both authors, and became widely known only in the 1930s.

Since philosophers either remained 'speechless' or kept away from the book even before they had read it, who were the readers, amounting to hundreds of thousands in Germany alone? Most likely not the 'man in the street', probably the well-to-do citizen, but mainly the intellectual with a keen interest in social and political questions. More working class people are likely to have heard about the book and discussed it with others rather than to have read it themselves.

The book has, in the words of Helms (1970:276), '[eine] dämagogische Effizienz' ([a] *demagogic efficiency*); '...[sie] erklärt sich vor allem aus seiner Sprachbehandlung' (...*its explanation is above all the way he deals with language*). Stirner's dealing with language is extremely complex, relying on numerous components that work in dif-

ferent ways for one, intended or unintended, single objective: to keep the reader spell-bound and, in most cases, utterly confused. What does the reader get? Iconoclasm is one of the devices employed. The actual world of Stirner and his readers is a narrow world, with countless restrictions placed on them. In the virtual world sketched in the book all those restrictions are wiped out. And this process of eliminating obnoxious instruments used by the powerful to make me powerless, is something I can participate in, I experience it in my own mind while observing the dismantling and destruction of all concepts.

In this connection Stirner proclaims that language 'lacks something that it desperately needs—the political style'. He is bent on filling that void with devices which he creates for and employs in his *opus magnum* from beginning to end, thus equipping it with a superbly effective demagogic dimension. Using the first person singular, his readers are enticed to identify themselves with him, the Self, the Ego. The simplicity of grammatical form, masterfully enhanced by making ample use of phonetic features such as alliteration and assonance, is matched by minimal demands on the readers' involvement via reflection. The Ego is now free from any inhibitions, any restrictive obligations, is free to embrace whatever it likes best, with no limit of any kind in sight. Stirner's language engenders a fear-reducing and trance-inducing effect. Why should you continue to be exposed to fear? All previously existing barriers and constraints are summarily discarded. Gone forever, all obstacles are declared invalid—by magician Max Stirner's decree.

And why should you be so blind as to get immersed into a desultory trance? Because there simply is no other viable choice. The alternative for the afflicted, vulnerable reader is to be delivered back to gruesome reality. Which, incidentally, is the fate of Stirner himself, whose brief span of glory ended about two years after the publication of his book and was replaced again by a life of misery, a life eventually cut short by the bite of a poisonous fly.

Stirner's latest revival started in the 1960s. It is largely due to the fact that *The Ego and His Own* continues to be to some minds a bountiful quarry for components seemingly capable of dispensing relief for a large variety of very real cumbersome social malaises. That is not likely to go away in the foreseeable future.

What hopefully will be changed sooner rather than later is that those who deal extensively with Stirner's book—mainly political scientists, philosophers, sociologists, and most likely also a large group of 'indefinables'—will come to realize that all the Stirner materials they employ for non-linguistic use have been elaborately prepared by very specific linguistic means.

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FROM THE NINETEENTH TO THE TWENTY-FIRST CENTURY:
THE CLIMAX OF COMPARATIVE LINGUISTICS?

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I WOULD NOT INDULGE IN AUTOBIOGRAPHY, except where my experience may profit my readers, and others later. I had the luck to be born (in 1921) among people who favored the learning of languages; in time, with setbacks, I became one heir of the great scholars that made the study of language into a science. Each of them drew upon the languages they had learned well; from there came the clues toward something universal, and knowledge of languages kept increasing.

But we cannot assume that the long trend will continue. The present indications are that fewer men and women, even those who are curious about languages, will grow up *educated* in more than one or two. For lack of that, I expect that a larger *mass of data* from hundreds, even thousands, of languages will be available on a computer—perhaps extensive vocabulary lists, with English glosses. Given such material, some research can go ahead; but the glorious break-throughs are in the past.

Europe in the eighteenth and nineteenth centuries was full of educated polyglots. They spoke and wrote several modern languages; they had studied Classical Latin and Greek grammar and literature. They could face the complexities of Sanskrit, and some (especially Jews) knew Hebrew, or even Arabic. They had so solid a foundation to build upon indefinitely, as they took on still more languages. Rare men of genius—to mention Champollion and Rawlinson—even figured out how to decipher the ancient scripts of languages, utterly forgotten for millennia. Others discovered the prehistoric, ancestral connection between Hungarian and Finnish, or between Sanskrit and its distant relatives in Europe, or between the Semitic family and languages of Africa.

The ultimate goal was to embrace all languages of the world, assembled in one library. A surprisingly ambitious effort, although premature, was made by the Imperial Academy of Sciences in St. Petersburg during the reign of Catherine the Great. Being a German princess by birth, she patronized numerous learned men from her native country; and they did much to establish in Russia a Western European pattern of genteel culture, adopted by noble families and the middle class.

I come from a family of Russian Jewish immigrants in Milwaukee, and afterwards in Chicago, who respected that culture. My parents spoke English to each other and to the children—Yiddish only to older relatives or to others strange to this country. Of my paternal grandparents I remember the faces—but whatever they may have said in Yiddish, just one word sticks out, often repeated by my grandmother at the table: [es, es] ‘eat, eat’. From a larger family circle I learned Yiddish songs, without

understanding what most of the words mean; and I saw my father reading a newspaper which he called [forverts], but he never said anything about it.

As I settled down to ignorance of Yiddish, I kept reading books in English. Around the age of four I had made a habit, after my mother read me a children's book, of picking it up and going over it myself in an undertone or silently. She soon caught on that I knew how to read, with no particular instruction. There were many books around the house, and she began taking my brother and me to the public library to choose whatever we wanted.

When I was eight or nine, my cousin Edith came to live with us after graduating from Kalamazoo College. Among the books that she brought along from there, I hit upon her French textbook with the title page *The Phonetic Chardénal*; and I studied it from beginning to end. In retrospect, it seems that here I found a novel satisfaction, the opposite of the frustration I had had with Yiddish: through this book I could get right inside another language, how to understand anything in it, and to reproduce it either orally or in writing. Reading French too, I found, was no harder than English. Chardénal was one of the first textbook authors to adopt the International Phonetic Alphabet—which had been devised in France as a method for learning the pronunciation of English. The usefulness of a phonetic alphabet was appreciated in America too. To me Chardénal's French words in phonetic characters were easy; it reminded me of my mother's English dictionary: Funk and Wagnall's had already gone over to this more accurate notation of the sounds of English¹. Chardénal gave, along with the phonetic characters, precise instructions how to produce the nasalized vowels and other French sounds strange to English.

The next stage in my linguistic education came when my brother entered high school and—upon our mother's advice—enrolled in Latin. He had trouble with the homework and asked her for help. I listened to her explanations, and by and by I began to read the textbook myself when he put it aside. Latin grammar was no more difficult than French had been; and the next year he brought home a book with excerpts from Caesar's *Galic War*—the first literature that either he or I ever read not in English.

In 1934, when I in turn enrolled in high school, my choice of a language was between Latin, French, German, Italian, or Spanish. Under the rules of the Chicago high schools, any prior knowledge was irrelevant; every freshman went into the class for beginners. For no reason that I can recall, I asked for French. The teacher was delighted to find one student that grasped everything she said or the textbook stated; she never asked me how I knew all this from before. I was not bored; I got interested in her pedagogy, coping with the difficulties that the others raised. The second year of French went into short stories by Daudet; later we read some fine novels and plays and practiced French conversation too, mostly about literature.

Finishing high school in the middle of the school year (1938), I was to enter the College of the University of Chicago the next September. Meanwhile I would read more French classics; but my mother also proposed that I use the interval to learn German and Spanish at the Berlitz School of Languages (in an office building downtown). When she was in grade school in Milwaukee, a German teacher would come

in for an hour every day for a lesson in reading, grammar, or literature². My mother had a lingering affection for the language of her old neighborhood and sometimes she sang a song of Schubert.

The Spanish class at Berlitz was one hour after the German—convenient for me, and I liked the lessons. The teachers were committed supposedly to the Berlitz method, as though each student were like a foreign visitor listening to a monoglot native guide, without access to an interpreter, dictionary, or grammar. However, when someone in the class did not grasp the point of the lesson, the teacher would resort to a grammatical explanation that he knew from his own schooling, before he was hired by Berlitz.

We had no songs nor literature; but when I quit the school, I bought their book of readings in Spanish. There I found a couple of chapters from *Don Quijote*, and sonnets which I relished the most.

In my first year at the University of Chicago most of my time was taken up by required survey courses; as a freshman I had room for just one elective. Consulting an advisor from the dean's office, I thought I would eventually major in French or in Romance languages; so he recommended Latin *for background*. At that brief interview I did not mention what I had learned years earlier; so I was put into the elementary class. The review deepened my mastery of Latin grammar and vocabulary, and the class read more of Caesar. The next summer, on my own I finished *De bello Gallico* and tackled the *Aeneid*.

But in my sophomore year my studies took an unforeseen turn: in my class on English composition, a classmate had told me how much she enjoyed studying Greek, and she showed me her textbook; that made me choose this subject for my next elective. The instructor, David Grene, rushed through the most essential grammar in just eight weeks, even at the cost of losing two thirds of the students, as they could not keep up with his pace. But those who survived were soon reading Plato's dialogue *Crito*, and after it the *Symposium*; so we listened in on Athenians talking to each other. The teacher was eager to have the most capable ones continue; he spoke to me privately and urged me to make Greek my major, with graduate school in view and a career of university teaching.

I put him in charge of my studies. The next year, besides courses in ancient history (with a mainly political emphasis), he had a few of us reading chunks of the *Iliad*, Herodotus, and some Attic tragedies. For my separate tutorial he selected Pindar's odes celebrating the victorious chariots at Olympia and Delphi. But this Greek was too difficult for me; so he shifted me to Hesiod's *Works and Days*, and later Aeschylus' *Oresteia*. I felt well repaid for my pains, since Greek literature—more than anything else—tells how the human mind took shape in the mythical past but gradually developed reason.

During my senior year, my mentor was Benedict Einarson, whose approach was different but no less profitable. The first text was Xenophon's *Memorabilia of Socrates*; and since Xenophon's Greek is easier than the average and the content not profound, the class time was used mainly to clear up the odds and ends of grammar mixed up in the students' heads. Outside of class, each student was to read through one

of the standard grammars. I had lately bought a second-hand copy of Brugmann's *Griechische Grammatik*; I carried out the assignment, consulting a German dictionary whenever necessary. (Until then I had read no German text longer than Goethe's play *Götz von Berlichingen*.) Through Brugmann I got a huge digest of Indo-European (or Indo-Germanic) research, reaching back nearly a century.

Having emphasized Greek, I was encouraged to take advanced courses in Latin literature too; the Latin department waived for me the usual prerequisites. At this university, Sanskrit also was offered; George Bobrinskoy was the professor, who had ranged amazingly in his interests as he grew up in Russia before the Revolution³. Now as a faculty member of an American university, he took the Harvard model for his class: the textbooks were Whitney's *Sanskrit Grammar* and Lanman's *Sanskrit Reader*. Whitney's book is a complete reference grammar, not designed for beginners, but Lanman (who succeeded him at Harvard) introduces the language by slowly reading a few pages—in transcription—from *Mahabharata*, and thereafter giving the original Devanagari syllabary, always with copious notes that refer by number to the section or sub-section where Whitney treated the specific topic. The method is workable but tedious. All but me in the class were graduate students; none of them were willing to continue into the winter quarter, when we were to get into the *Rigveda*—the oldest poetry preserved in any language.

In the spring Prof. Bobrinskoy offered a somewhat compressed course on Avestan and a few weeks of Old Persian. Besides me, one new student from another college joined the little class. The structure of these Iranian dialects, while strange, was analogous to Sanskrit. The message of the Zoroastrian scriptures is less inviting than other texts I had read.

During my years in college, I was slightly exposed to Hebrew, but learned little besides the alphabet. Since my parents were estranged from the religion of their elders, I grew up never hearing prayers nor even seeing Hebrew letters on a gravestone. But I had one acquaintance in our neighborhood, Samuel Zisken, who went on to the University; sometimes we commuted together. He became, in his teens, an earnest follower of an old-fashioned rabbi, and they regularly read Talmud. Sam reached out to me and offered me Hebrew lessons. The few first sessions were fruitful; Sam's textbook for beginners, however, was slow-moving; the key principles of grammar were illustrated by one sentence or two, limited to the vocabulary of the classroom; e.g.

הַיָּלֵד כוֹתֵב עַל הַלּוּחַ

'the boy [is] writing on the blackboard.'

Sam himself knew a lot more, but he had little experience as a teacher. After a couple of months I had to quit, when my family moved to another part of the city. It would be nearly ten years before I returned to Hebrew—in more favorable circumstances.

Graduating in 1942, I soon went into the army and was assigned to the Signal Corps because of my knowledge of languages. (For my spare time I took along the entire *Odyssey* in Greek. I started by memorizing the first two hundred lines; it took

me five or six months to read through the rest of it.) At Vint Hill Farms Station in Virginia, most of the recruits were assigned to study not only cryptography but Japanese, for eventual work in deciphering intercepted messages somewhere in the Pacific. But I was among the few to be given instead Spanish—just ordinary, easy texts, of diplomatic rather than military content. Our teacher used the Mexican (or Andalusian) pronunciation, making *ciento* sound like *siento*, and *haya* like *halla*—which conflicted with the conservative Castilian that I knew from my Berlitz teachers, one from Peru and one from Cuba. This sort of discrepancy between ‘native’ speakers was a permanent bit of my linguistic education.

As it turned out, just one skill of mine—typing—had a real niche in the Signal Corps. I was shipped with a detachment of fifty to reinforce the cryptography staff of the headquarters near Algiers. But we arrived there in May of 1943, right after the German and the Italian armies in North Africa surrendered. Someone at the headquarters decided that now there was more need for teletype operators; so those who were good typists were put to that work, regardless of our previous classification for some other specialty.

But aside from disappointment at being stuck in that kind of job, Algiers was a nice place, and one day a week I was free to go about. Algeria had become a polyglot country since 1830, when the French navy began the take-over from the Barbary pirates. Most of the population in 1943 was still Arabic or Kabyle; but settlers from Europe, in the capital, predominated so much that *les indigènes*, to deal with them there, needed some French. It seemed to me a good opportunity to learn Arabic; and I bought a couple of books with *L’arabe* in the title, but I made no headway into the subject. The sounds peculiar to Arabic were likened so vaguely to rough equivalents in French that I could not tell them apart. The Arabic words in each lesson were in Arabic letters, but accompanied—to make them more or less recognizable—by a loose French transcription that left me baffled.

I might have stayed with a fruitless project on and on, had not another soldier, who knew the city better, guided me to the section where the University of Algiers was located. The bookshops around there were stocked with editions from France for the traditional academic curriculum, especially the Latin, Greek, and French classics. I bought a Greek-French dictionary and the entire *Iliad* in one volume with footnotes in French. I went through it more easily than when I was a student at the University of Chicago. Not much later I was back at the same shop and picked out Pindar’s odes in the Budé series—the Greek text and a French translation facing it. I remembered how hard Pindar was three or four years earlier; my Greek was now stronger.

The barracks for the signal companies were in the rooms of schools commandeered in the suburb of El-Biar (which originally meant ‘the wells’). A neighbor, Madame Féménias, did my laundry; I made friends with her and her family. They were French monoglots, although their ancestors had immigrated from the Balearic Islands and spoken *patois* (i.e. a dialect of Catalan). From more recent relatives they had a family photograph with a greeting written in Spanish: ‘Á nuestros primos en Árgel’.

As the war against the Axis gained ground, the Allied headquarters was moved to Caserta (north of Naples), and most of the Signal Corps personnel were relocated. The country is wonderful for sight-seeing and is the home of the Italian language; I could not pass that up, with my background in Latin, French, and Spanish. Another soldier handed on to me a used beginner's book, aimed at Englishmen sojourning in Italy; everything in it was clear. To get more instruction and practice, I made the acquaintance of Anna Simonelli, a former elementary schoolteacher eager for respectable professional work. She met me for weekly lessons at her family's apartment on a side street not far from the Reggia di Caserta. She had me read classical prose of the nineteenth century, culminating in *I promessi sposi* by Manzoni; then on to great poetry: *Gerusalemme Liberata* by Tasso and finally *La Divina Commedia*. I also wrote essays on these and other literary subjects; we conversed in Italian exclusively. We became so well acquainted that toward the end she talked about the sorrows in her life, and how she, unlike her mother, could no longer believe in prayer or in God.

A visit to Florence was my last memorable experience before I was eligible for discharge. I drank in the beauties of the Renaissance and talked to interesting strangers in their own language.

Back at home in 1946 I conferred with David Grene and Benedict Einarson at the University of Chicago and took courses in Greek and Latin literature to fulfill the residence requirement for the doctorate. But a welcome complication soon set me moving again: Prof. Einarson recommended me to the Society of Fellows at Harvard University (where he himself had been a Junior Fellow in his youth); my appointment ran from 1946 to 1949. Under the conditions set by the donor⁴, I was free to pursue my studies entirely according to my own judgement, attending any classes that interested me; but the three years could not be counted toward a degree at Harvard. For me, the fellowship had no inconvenient side, since my advisors at the University of Chicago assured me that I had only to participate in two professors' seminars at Harvard, each lasting for a semester, and to write a dissertation at my own speed—sending it to the Classics department in Chicago a chapter at a time. Then I would be ready for the final written and oral examination there in the summer of 1949.

Most of my time during those three years, I was indeed on my own. I read those classics that particularly appealed to me, regardless of any list; I returned to Lanman's *Sanskrit Reader* and reviewed all his selections from the *Rigveda*. I sat in on Joshua Whatmough's class dealing with comparative grammar of Greek and Latin, which not only refreshed my memory of Indo-European from Brugmann but brought it up to date; for Whatmough contributed his unique and exhaustive research in the Keltic and Italic branches. I made some use of the comparative method in my dissertation.

During my last year I attended Robert Pfeiffer's class in Biblical Hebrew. In the army I shook off the influence of atheism, which had attracted my relatives (although the earlier generations had been devout Jews). While living in Cambridge, I began to attend the Sabbath service at a synagogue; soon I wanted to understand the prayers. The prayer books had an English translation facing each page of the Hebrew text; but I wanted to follow the original—at least as well as I understood the Latin of the Catholic

Mass. So I profited from Dr. Pfeiffer's instruction, all the more because I had already grasped the principles of linguistics: I could see through the fundamental weaknesses of Davidson's *Hebrew Grammar*, though I did not argue during class time⁵.

In my subsequent research, Hebrew has been essential. Kenneth Pike⁶ once asked me—in conversation—how it came about that so many anthropological linguists, such as Franz Boas, were Jews. I could not think of a clue from personal acquaintance; but afterward it occurred to me that in many countries it has been common for more Jews than Gentiles to be polyglots—for example, learning from childhood a Jewish vernacular (Yiddish or Judeo-Spanish), then Hebrew or even Aramaic for religious education, besides the predominant or official language of the region, or more than one such. To learn languages is something we take in stride.

My first job was at the University of Chicago, on a large staff teaching European history at the sophomore level of college. My colleagues decided to have a unit on the Albigensian Crusade, including an excerpt by an anonymous Inquisitor. For our students, who had come from high school able to read English only, I was asked to translate the Latin text. I looked it up in an edition with accompanying French version, which made the task easy. Another colleague brought in a chapter by André Piganiol on the decline of the Roman empire; that too I volunteered to translate. A third text was the oration of Aelius Aristides in praise of Rome—an impressive Greek monument from the 'Second Sophistic.' I was previously unacquainted with that particular author, and few of his works had ever been translated into any modern language; his Greek was moderately challenging. My colleague knew *To Rome* only in an Italian translation, *In gloria di Roma* by Luigia Stella, which I found helpful in some passages; in others I decided that Stella had erred on the side of paraphrasing, and that a literal rendering would be better.

To Rome in my translation was printed by The Free Press in time for the next academic year. Soon afterward a translation of this and several other speeches of Aristides was published by an older, more eminent American Hellenist, who (unknown to me) had been working on them through most of his career. But at some juncture he learned of my isolated publication and felt obliged to hold off a while, until he could thoroughly compare my version with his own. He decided not to change anything; and the main difference he found was that my style was too colloquial for his academic taste.

In 1951 I moved on, to the department of Classics at Washington University in St. Louis; mainly I taught Greek and Latin to replace two older professors who were retiring. Presently an opportunity came to introduce Biblical Hebrew also. I composed my own lessons for beginners; the university bought me a Vari-Typer, so that I produced pages with Hebrew, Greek and phonetic characters. My research in the ancient languages progressed; and with a fellowship from the Ford Foundation I had leisure to use the fine libraries in Chicago.

I returned to Washington University in 1954 as an associate professor. While writing up some notes from the previous months, I was struck by one precise morphological and phonological agreement between Homeric Greek and Biblical Hebrew; it

has opened the way for me, for the rest of my life, into the prehistoric connections between the Indo-European and the Semitic phyla. The genitive dual ending *-oiiv* as in *ποδοῖiv* ‘feet’ has its equivalent {-*ḡyim*} in a pausal position of a verse of the Psalms or the prose Scriptures. Furthermore the Hebrew discrepancy—between an accented back-vowel [ɔ] in pause but a central vowel [a] in a non-pausal position—drove me to the conclusion that an entire tradition of Hebrew and Semitic grammar, reaching down to Davidson, was dead-wrong in analyzing the vowels. I had had misgivings about this from the time I first studied Hebrew at Harvard; but I acquiesced in the received doctrine, until the specific facts made it altogether untenable.

The Greek suffix *-oiiv* has no cognate in any Indo-European language, and the Hebrew counterpart is barely represented anywhere else in Semitic. So it soon became my major project to investigate fully the link between the two languages, which to my predecessors seemed unrelated. The ramifications took me further and further; I spent most of my free time for five years writing *The Indo-European and Semitic Languages, An exploration of structural similarities related to accent, especially in Greek, Sanskrit, and Hebrew*. Then, while seeking a publisher for that book, I turned to another kind of linguistic subject within the field of Greek, and wrote *The Linear B Decipherment Controversy Re-examined*.

I moved to Harpur College of the State University of New York in 1961 as a full professor. Among the things that attracted me were the ambitious plans of the Humanities division to enlarge the teaching of languages. Also the university press in Albany, newly organized, took on the printing of my two books.

The dean of Harpur College set up departments for all the languages; Latin, Greek, and Russian in one department, with me as chairman because of my rank. I felt awkward as the only one ignorant of Russian; so I studied a beginner’s grammar, and my colleagues helped me through difficulties. Later I read with pleasure a short story by Pushkin and one by Tolstoy—looking up hundreds of words in a dictionary. I could even accept an invitation from the editor of *General Linguistics* to review a book by a Soviet scholar Otkupščikov, Из истории индоевропейского словообразования, about Lachmann’s ‘law’ and other Indo-European problems. Ever since then, I have brought Russian and other Slavic evidence into my comparative studies.

When Arabic was added to the curriculum, I sat in on the elementary class taught for the first time by Dr. Khalil Semaan. Unlike my disappointing experience long ago in Algiers, now I found the language approachable in spite of the intrinsic difficulties. My study of Hebrew for nearly twenty years allowed me to absorb any Semitic kindred language, even though I had not much leisure to devote to Arabic. I acquired enough to look up a word in the Koran, and fit it into the construction of the verses where it occurs.

Another language—taught only on infrequent occasions—was (hieroglyphic) Egyptian. Dr. Gerald Kadish of the history department offered it one year, and I joined the class unofficially. His knowledge was such that he had hardly one rival or two in the entire world. While I concentrated on his presentation and on the chapters of Gardiner’s *Egyptian Grammar*, the fundamental structure continued to perplex

me. The papyrus texts selected by Dr. Kadish were intriguing and worth struggling with; but I did not get the hang of them or feel I was entering the community that the authors addressed.

A visitor from Nigeria for a month or so gave several of us some lessons, purely oral, in Hausa. Only a few words and phrases stuck with me; and I did not perceive the role of pitch in this language until much later, when I became personally acquainted with Carleton Hodge and looked up his structural grammar of Hausa in the library. This is the strangest language that I ever encountered; I wish there had been an opportunity to learn it really. At any rate I have noticed some amazing cognates between Hausa and the Semitic languages, including Hebrew.

Around 1962 I attended a conference that Joshua Whatmough had planned shortly before his retirement; it was to meet at Harvard University, but through some disagreement it was held at MIT instead. There I heard Noam Chomsky for the first time. He said nothing revolutionary; but as his fame grew, I learned that his first book was a grammar of Hebrew (on that subject his father was an authority). But the younger Chomsky went on to work out a universal theory of language that enabled him to rely on evidence from English alone⁷. This was an intriguing proposal and deserves investigation, but it had the odd corollary that in our profession it is unnecessary to learn languages.

It ought to be a commonplace of linguistics that once anyone has acquired a language at home, it affects his attitude as to how languages in general operate. But to become a linguist dealing with various phenomena, one must—besides that primary influence—get acquainted with one or more other languages. Among the achievements of modern linguistics was the discrediting of the former belief that the cases of nouns and pronouns in Latin and English are the same, and accordingly that it is a grammatical error to say, for example, *Me and him are friends*. Instead it was shown clearly how English and Latin differ in their syntax, but also wherein the English usage of many educated people has been affected by their training in Latin grammar. Disciples of Chomsky, however, maintain that those old terms for cases apply truly to the analysis of sentences in English—or even that something inherent in language itself makes the cases indispensable everywhere.

The Chomskyites gained control of the Linguistic Society of America; and some dissenters, excluded from its programs, organized the Linguistic Association of Canada and the United States in 1974. John Peter Maher invited me to join; I had already given up on the LSA, because those members still interested in comparative linguistics were unwilling to broaden it, or pay attention to my research on relationships between the phyla of languages. I presented to LACUS a paper on 'Greek occupational terms and their Semitic counterparts', which the new audience received with favor. Every year after that I was on the program, sometimes with a topic from my Indo-European and related research; but more often I thought up something less recondite, that would interest the members of LACUS in general.

My activity may continue for a while into the twenty-first century; and after my generation is laid to rest, linguistics will go on—I dare not predict along what lines. I

realize how little I could have accomplished, had it not been for the great scholars of the centuries before I was born.

Only the future will show whether I have in turn contributed anything of lasting import. What I have learned has enriched my own life immeasurably. My published studies which matter the most are the ones where I did my very best—better than anything else that I might have done, and no contemporary was capable of doing as well or better.

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- ¹ As a concession to old-fashioned teachers, it also gave Webster's clumsier rendering of each word, with the misleading macrons, digraphs, etc.
 - ² This enrichment was abolished in 1917, as public opinion throughout the United States turned against everything German, after the declaration of war.
 - ³ Another Russian exile, N. S. Trubetzkoy, was the greatest linguist of the age; he had no equal anywhere, for knowledge of facts and for probing into theories. He used to draft his work in Russian; but then, if it was on a comparative topic, for publication he would translate it into German or French. His masterpiece *Grundzüge der Phonologie* came out posthumously (Travaux du Cercle Linguistique de Prague, 7, 1939). By studying his research into Indo-European, I found much that throws light on the problems I was investigating.
 - ⁴ Abbott Lawrence Lowell, the former president of the University, believed that the Ph.D. was being over-valued, and that this new kind of fellowship would become another way to demonstrate academic excellence.
 - ⁵ Dr. Pfeiffer gave me a parting gift, autographed copies of his books on the Hebrew Bible and the Apocrypha—with an expressed hope about my future.
 - ⁶ Famous for his unique skill in eliciting, anywhere in the world, any and every language from a solitary informant.
 - ⁷ In the paper which he read in 1962, 'The Logical Basis of Linguistic Theory', published in *Proceedings of the Ninth International Congress of Linguistics* (The Hague: Mouton, 1964), he cited material entirely from English.

On the intrigues in the background of Chomsky's role at MIT during these years, see E.F. Konrad Koerner, 'The Anatomy of a Revolution in the Social Sciences: Chomsky in 1962', *Dhumbadji!* vol.1 (1994):3–17; and Robert L. Miller, *The Linguistic Relativity Principle and Humboldtian Ethnolinguistics* (The Hague: Mouton, 1968).

III



NEUROCOGNITIVE
PERSPECTIVES



RHYTHM AND INTONATION CONSIDERED NEUROCOGNITIVELY

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INTRODUCTION. This paper was inspired by Sydney M. Lamb's *Pathways of the Brain: The Neurocognitive Basis of Language* (1999), which presents a model of how the human brain deals with language and learning, while insisting at the same time on the 'neurocognitive plausibility' of all linguistic work. This point seems perfectly obvious and sensible when one comes to think of it, but simply never occurs to most linguists, including myself before reading this book. It immediately made me want to relate my own work, especially that on (British) English rhythm and intonation, to the neurocognitive phenomena described by Lamb, and this is a modest first attempt to do so.

Since about 1980 all my (neo-Firthian/Abercrombian/Hallidayan) work has been embedded in the so-called FM or FORM \longleftrightarrow MEANING approach developed by my Amsterdam colleague Nel Keijsper (1985) and others. Essentially, this is a 'back to Saussure' movement regarding language as a network of SIGNS, each with a FORM and a MEANING, in reaction to fashionable 'formal' theories that divorce meaning from form or ignore meaning altogether. Much of Keijsper's work is based on that of Dwight Bolinger, whom she followed and admired (see for instance Keijsper 1987 passim), and so, consequently, is my own. The following from Bolinger (1951:210), quoted in Keijsper (1984:20) gives an indication of the kind of views involved:

Oddly, a fact that would delight any other kind of scientist—that semantic value is correlated with formal shape, the surest guarantee that the forms singled out are no accident—seems to strike many linguists completely on the blind side.

It is interesting to observe that Bolinger 'served as first president of The Linguistic Association of the U.S. and Canada, an organization to which he remained especially dedicated because of the compatibility between his views and theirs about the role of functionality in linguistic structure' (Stockwell 1993:99) and that Lamb was the last president, until the present (30th) Lacus Forum. There seems more to this than mere coincidence.

As is well known, one of Bolinger's lifelong pursuits was to demonstrate, against all sorts of alternative views, the *direct* relationship between the FORM 'pitch-accent' and the MEANING 'highlighting, importance' of the word in question. He was also careful to distinguish this from other features like 'terminal endings' (Bolinger 1986:26). The last British intonationalists to distinguish between pitch-accent on the one hand

and falling/rising ‘tune’ on the other were Armstrong and Ward (1926 *passim*), all their successors—inexplicably, obfuscatingly—conflating the two. One other striking characteristic of Bolinger’s approach and most relevant to our present concern, is his view of intonation as ‘part of a gestural complex whose primitive and still surviving function is the signaling of emotion’ as ‘can be seen in the evidence coming from neurolinguistics and allied research.’ (Bolinger 1986:195).

The following (incomplete) presentation of intonation and rhythm may be seen as an application of Bolinger’s ideas to British descriptions, supplemented with some of Keijsper’s semantic notions. Apart from ‘tonics’ (following Halliday 1963 we prefer this term to Bolinger’s ‘pitch-accent’) and ‘tunes,’ it recognizes a system of four ‘tones’ operating within the tonic, each with a FORM and a MEANING. All these four forms are widely recognized by British intonationalists, albeit *not* always in both falling and rising tunes and *not* as Saussurean SIGNS, as we do. Following Keijsper (1985), the linguistic SIGN T(onic) (with the MEANING *contrast*, i.e. rejecting/discarding alternatives) is differentiated on sequential criteria into L(ate), E(arly), and P(re-) nuclei, with the more ‘delicate’ not-this-but-that MEANINGS *introduction*, *discovery*, *selection*, respectively.

The Abercrombie-Halliday phonological FORM (!) hierarchy tonegroup>foot (>syllable >phoneme) was also modified and expanded on Bolingerian/Saussurean principles to a SIGN hierarchy: location>piece>byte>word>... (Van Buuren 1975, 1981, 1985). Roughly: our piece is a SIGN-unit with the FORM tonegroup (occasionally containing sub-tonegroups for vocatives, tags...) or tune, and the MEANING *piece* of information (for the hearer) or *idea* (for the speaker). The byte is a SIGN-unit with the FORM foot or rhythm-group (here too, hierarchies—of IAMB, TROCHEE, DACTYLOS, AMPHIBRACH, ANAPAEST and/or MONE—may, indeed commonly do occur) and the MEANING *thought* or mental gesture. Our phonological word is a SIGN-unit with the FORM close-juncture phonetic entity and the MEANING *concept*, and the location is a SIGN-unit with the FORM breath-group and the MEANING *sententia* or complete message. Or putting it more simply: speakers have *thoughts* (=mental-gestural-vocal gestures), which are themselves constellations of one ‘gesture’ *concept* with or without unstressed *automatic reflexes* like articles, prepositions, auxiliaries, etc. Thoughts combine into constellations of thoughts or *ideas*. Ideas combine into constellations of ideas or *sentences*.

Finally, starting from Abercrombie’s (1964) work on rhythm, we distinguish 4 degrees of stress: S, M, w, z. Below, we shall only mention S(trong stress) and u(nstressed), omitting reference to its differentiation into w(eak) and z(ero) in two or three tier foot-hierarchies, and to M(edium) stress. Rhythm being the last big hurdle in phonetics, its finer details must be put off to some future occasion. See, however Van Buuren (2000 *passim*, 2003 *passim*) for more discussion of rhythm and *ibidem* (2000:12) for a more detailed diagram of the Saussurean SIGNS mentioned so far.

1. TUNE. In the following soliloquy, the symbols |, // and # stand for byte, piece and location boundary respectively. Tonic syllables are in capitals and may be said (for instance)

on a high fall (cf. section 4, below). To get this right, the reader may be advised to also nod the head, on the T-syllables *only*. Next, each of these 23 pieces may be said either with a slight upturn in pitch at the end of its last syllable (R-tune) or with a slight, approximately semitone, final downturn (F-tune), *keeping everything before it absolutely identical*. These are the FORMS of the R and F SIGNS. Knowing all this, it should be quite easy to first say all 23 pieces with R (popularly but misleadingly known as question intonation) and then with F (popularly known as statement intonation).

- (1) your HOUSE| is on fire# but i LOVE you| darling# this COULD be| the right|
 answer# i FOUND| some MONEY| lying| on your desk# TOMORROW# if YOU|
 could pick up| the CHILDREN| first# we could MEET| in TOWN# will you| SHUT|
 UP| for a moment# you LOVE me# DONT you# ISNT she| BEAUTIFUL# ONE# TWO#
 THREE# good MORNING# WHO# are YOU# whats your NAME| then# WHEN| did
 we LAST| meet# sit DOWN then# and MAKE up| your MIND# DONT| be SILLY#
 HIT me| then#

The MEANING of F is (merely) *and nothing else*, that of R *and not nothing else*. Clearly, this F MEANING, common to these and all other utterances studied so far, may be used and/or interpreted, depending on context, syntax, lexis, etc., as: final, determined, authoritative, reassuring, impolite, rude, impatient, demanding, stating. Similarly, the R meaning may be used or interpreted as: non-final, questioning, suggestive, enquiring, friendly, polite, challenging, and so on. The reader is invited to make up or listen for counter-examples falsifying this FORM \leftrightarrow MEANING analysis.

As suggested by Bolinger, accompanying non-vocal gestures by eyes, face, head, hands, arms, etc. are common, indeed inevitable. Apart from gestures on the T(onic) syllables, one also tends to make downward facial and hand gestures with F-tunes, and upward gestures accompanying R.

Man does not live at a timeless point between past and present. Our 'psychological present' tends to be between 2 and 5 seconds (Fraisse 1984:185–87). Lamb (1999: 181) mentions 'inner speech (...) the circulating of activity back and forth between the two [viz. productive and receptive – LvB] phonological systems [viz. in the brain – LvB]. Another important function of this inner speech loop is to keep an incoming sentence 'alive' in our awareness while we decode it.'

The locution (i.e. single breath-group) # TOMORROW# if YOU| could pick up| the CHILDREN| first# we could MEET| in TOWN# takes nearly 5 seconds to say and could easily be expanded to 8 or 10 seconds. The piece, # if YOU| could pick up| the CHILDREN| first# takes about 2½ seconds. At the end of it, its beginning is still 'present'. It seems that this *must* require a neurocognitive loop, for both speaker and hearer, from the thought or mental gesture [if YOU| to that of |could pick up| to that of |the CHILDREN| to that of |first|, i.e. including innervations of the cortical sections for the concepts 'you', 'pick up', 'children', 'first'. So I find myself in fact *predicting* that if and when brain-scans become sufficiently accurate such 'circulating of activity' should be visible and therefore would invite neuroscientists to falsify this, and following, *predictions*.

What will happen, brainwise, when we get to the next loop, // *we could MEET| in TOWN*//? The two loops do not make up a single one as if there were no piece/idea boundary. At the same time, the earlier loop cannot just be set aside as over and done with. The obvious answer therefore seems to be that the earlier innervation loop becomes part of, embedded or incorporated into the later one. A locution could then be defined as a *hierarchy* of innervation loops. Considering that language (and music!) is full of hierarchies, this may not be such a far-fetched idea.

The last question to be addressed here is what would be the difference between F and R activations. Assuming that our linguistic analysis at this point is not too far off the mark, it would lead to the conclusion that neurocognitively an F ‘and-nothing-else’ meaning requires de-activation, indeed positive blocking off of any other potential loops besides the one actually being realized, whereas an R meaning does not. Instead of a relatively isolated activation pattern this would have a less clearly circumscribed activation pattern, with links/extensions to other patterns.

F(alling) and R(ising), like most intonational choices, must be seen as end-points on a continuum rather than as discrete entities.

While writing this section, I am beginning to feel that an $F \longleftrightarrow M$ (or other) linguistic analysis could contribute to an understanding of the brain and, conversely, that an awareness of neurocognitive processes may give one a better insight into one’s linguistic work.

2. TONICITY. In example (2)a–g, *T* stands for Tonic syllable/word, *S* stands for (non-tonic) Strongly stressed syllable/word, *u* stands for unstressed syllable/word. In reading these too, it helps to nod the head *only* on the T-syllables. Note that the present analysis, unlike many others, allows for more than one Tonic per piece.

- (2) a. your HOUSE | is on fire #
 u T | u u S #
 b. your house | is on FIRE#
 u T | u u T #
 c. your HOUSE | is on FIRE#
 u S | u u T #
 d. YOUR | house | is on fire #
 T | S | u u S #
 e. your house | is | on fire #
 u S | T | u S #
 f. YOUR | house | is | on FIRE #
 T | S | T | u T #
 g. YOUR | HOUSE | IS | ON | FIRE #
 T | T | T | T | T #

The FORM of an S stress is a rhythmic beat or ‘ictus’ without (!) any pitch-jump onto the syllable concerned, often (but not necessarily) accompanied by ‘pointing’ with

a finger and/or the eyes. The FORM of a T accent is an upward or downward pitch-jump onto an S-syllable (which thereby becomes T) \pm further pitch-movement (more details in section 4): this vocal gesture is inevitably accompanied by other (hand/head/eye) bodily gestures, such as the aforementioned nod. The FORM of u is: rhythmically 'suppressed' up-beat or 'remiss' syllable, shorter and less energetic than equivalent S-syllable and without (!) any accompanying vocal or non-vocal gestures.

The MEANING of a T-word/byte is *contrast*, i.e. rejecting or discarding alternative options in favour of the one actually chosen. The MEANING of an S-word/byte is *specification, naming*, i.e. of a concept already 'in mind' in some form or other. The MEANING of a u-word is *automatic reflex*, merely *referring* to a concept already 'logically given' by the context/grammar/commonsense/culture.

Neurocognitively, an S-word presumably involves a concentration or focusing of neural activation in the cortex on a conceptual nection already within a network of activity (cf. ex. (2)a '...I can smell something burning, smoke?, your HOUSE!! (discovery, see next section) is on ... (concept already inside network of activity)'. The innervation for a T(onic)-word/concept, on the other hand, would not involve strengthening of an activation already on stand-by but rather a (new) activation of one conceptual nection while simultaneously de-activating competing conceptual nections. In a detailed, accurate, ideal brain-scan of the future this should show up as the activations of one or more concepts being cut off and replaced by the concept expressed by the T-word. There must also be some conceptual innervation for the 'automatic reflex' u-words, or the speaker would produce gobbledygook. But it is difficult to imagine what form this might take, and I shall refrain from guessing.

Note that what applies to a speaker, need not apply to a hearer. To the latter, an example like (2)a may have broad (all new) or narrow ('house' new, rest given) tonic 'scope' or focus of information, depending on his state of mind. But not to a speaker! This so-called linguistic problem of 'scope of accent' is in my view a red herring deriving from a confusion of speakers and hearers. (Cf. Van Buuren 2004).

3. TONICITY AND SEQUENCE. In the following examples downturn \searrow and upturn \swarrow marks have been used to indicate F and R tunes. Most importantly however, T-words/bytes have been differentiated into L(ate), E(arly) and P(re) nuclear.

- (3) a. penelope | gave my kipper | to the cat \searrow #
 P | u u E | u u S #
 b. penelope \swarrow // gave | my kipper \searrow // to the CAT \searrow #
 L // S | u L // u u L #
 c. to the CAT | penelope | gave | my kipper \searrow #
 u u P | P | S | u L #
 d. my kipper | was given | TO | the CAT | by penelope \searrow #
 u P | u S | P | u E | u S #

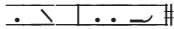
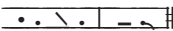
Note that (3)a consists of 7 words/concepts making up 3 bytes/thoughts < 1 piece/idea < 1 locution/sententia, whereas (3)b consists of the same 7 words/concepts < 4 bytes/thoughts < 3 pieces/ideas < 1 locution/sententia. Consequently, the conceptual-informational 'status' of four words is quite different. Cf. also the status of 'to, cat, penelope, kipper' in (3)c and (3)d.

If a new open choice or 'creation' like the P-byte |penelope| in (3)a is subsequently encased in a newer thought like |gave my kipper|, its range of potential alternatives is thereby (drastically) reduced to only those that could 'have given my kipper'. This is clearly so for the hearer, but also for the speaker, whether he has planned ahead or not. So the MEANING of a P-byte/word is *selection* from that restricted range. If that newer open choice |gave my kipper| then becomes encased in a non-contrastive, specified, identified, existing S-thought |to the cat|, its range of alternatives is restricted to what could possibly fill the slot in that 'given' context. The MEANING of an E-byte/word is therefore *discovery, revelation*. If the T-word/byte is not followed by other thoughts in the same piece, such as |my kipper| in (3)c, there is no such encasing or restriction. So the meaning of an L-word/byte is *introduction, creation*. Note that pieces ending in L-bytes create new ideas, and thereby contexts, whereas pieces ending in E followed by one or more S-bytes may be regarded as elaborations of existing contexts.

It is difficult to see how the neurocognitive processes for P(re), E(arly) or L(ate) 'nuclear tonic' might differ from each other or from those of T(onic), discussed above, other than by temporal position in the piece loop. For the hearer, in principle, and if heshe listens attentively, one could imagine blocking off of quite a few innervated connections from the concept communicated to himher and starting up some new ones, every time a T-byte is encased in another. The same would apply to the speaker if heshe has not planned ahead, but if heshe has, the range of neurocognitive innervations for selection and discovery would be more restricted than for L to begin with.

(3)d is in the passive. It may be suggested, however, that neurocognitively speaking, a speaker is not so likely to kick off with a syntactic choice between active and passive, but rather with his conceptual 'status' of kipper, Penelope, etc. The same applies, *mutatis mutandis*, to (3)c.

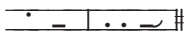
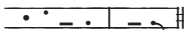
4. TONE

- (4) a. +tone your 'HOUSE| is on fire.~# 
 but i 'LOVE you| darling.~# 

The vocal FORM of a +tone is: upward jump-then-fall on Tonic syllable. Typical other gestures accompanying this vocal gesture are: hands held vertical, pointing upwards, near-shoulders (10–12 inches apart), palms pointing inward, then fairly energetic 8–10 inch downward thrust from the elbow with final flick from (relaxed) wrist; head: single downward nod/thrust; face: serious... concerned; eyes: wide open, looking at addressee.

The MEANING of a +tone is *committed* (unpredictable, preferred) choice of the T-word/byte, hence the most neutral, straightforward way of presenting information.

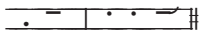
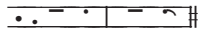
The neurocognitive ‘gestures’ or innervations for +tone would seem to require besides all those for T (P, E, L) (i.e. activation of one conceptual section while simultaneously de-activating the network of competing conceptual sections): energetic, ‘thrusting’ activation of the conceptual section chosen away from the centre/focus of the ‘network’, and ditto energetic pitch/motor activation in the cortex and beyond.

- (4) b. –tone your ↘HOUSE| is on fire↘# 
 but i ↘LOVE you| darling↘# 

The FORM of a –tone is: downward jump only onto T-syllable. Typical non-vocal gestures: hand(s) making rather gentle forward-downward movement, opening up from near-fist position close to chest to near-spread ‘offering’ position, with palms up, slightly cupped; head: very slight nodding; face: lips/mouth ending in reassuring (pouting) expression; eyebrows/forehead lowered; eyes: narrowed.

The MEANING of a –tone is *obvious* (predictable) choice, i.e. ‘just as expected’, implying ‘earlier’ state of mind and accepting reality/experience rather than committing oneself to an alternative option. Hence: ironical, uncaring implications in the first, R example (= obvious, but...) reassuring committed effect in the second F piece (= obvious, and nothing else).

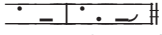
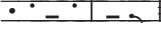
The neurocognitive ‘gestures’ or innervations for –tone would seem to require, in addition to the T features: relaxed, non-energetic further activation of a conceptual section already at the centre/focus of the conceptual network, and ditto relaxed, but precise pitch/motor activation.

- (4) c. =tone your ↗HOUSE| is on fire↗# 
 but i ↗LOVE you| darling↗# 

The FORM of an =tone is: upward pitch-jump only. Typical non-vocal gestures: hand(s): flap/wave, from fingers (nearly) touching chest, upwards and outwards to palms facing upwards at shoulder level, 18–20 inches apart. Head slightly tilted sideways, perhaps shaking in helplessness. Lips pursed at corners. Eyes wide open, looking upward, ‘innocently’.

The MEANING of an =tone is *equivalent* (uncommitted, random) choice, i.e. ‘just to mention something’, very common with R-tune (‘not nothing else in mind’) in surprised questions and listings, but avoided (at least in RP English) with F-tune (‘and nothing else in mind’) for its indifferent, uncaring, rude effect. Indeed, this F= combination is the only tune-tone conflation generally absent in accounts of British English intonation, with the notable exception of Crystal (1969). We hear (and use) it regularly on less polite remarks like ‘what the hell do I care’. The same ‘high-level’ ending is the neutral, committed pattern in Northern, Scottish and Irish English.

The neurocognitive innervations for =tone would presumably include besides T features: hesitant, arbitrary/random/undefined focussing of activation *anywhere* in a relatively large and vague network, and undetermined pitch/motor activation.

- (4) d. xtone your ▲HOUSE| is on fire.## 
 but i ▲LOVE you| darling.## 

The FORM of an xtone is: downward pitch-jump onto a T-syllable, then ascending-descending. Typical non-vocal gestures are: rather theatrical downward-outward movement of the hands, opening up from near-fist position close to chest, to palms up and fingers spread; shoulders hunched at the same time; head: repeated nodding; face: eyebrows/forehead raised; eyes: wide open.

The MEANING of an xtone is *exclusive* choice, i.e. ‘that and nothing else’, not just fairly neutral rejection/dismissal of alternatives as with +tone, but positive exclusion/blocking, suggesting ‘imagine all the unwanted alternatives!’ It is typically southern British English, common, for instance, in story-telling to children, but totally absent in news-reading. Note its nasty, sadistic effect in our R example and its conceivably overdone, insincere effect in the F piece.

The neurocognitive innervations for xtone may be assumed to be rather as for +tone but with more energetic focussing and extra activation *blocking* connections to other activated conceptual nections and more complex energetic pitch/motor activation as well.

5. CONCLUSIONS. Scientific progress depends on the falsification of theories and their replacement by better ones. My ‘predictions’ of the neurocognitive processes innervating the linguistic SIGNS discussed may therefore be seen as an invitation to neuroscientists to prove me wrong and come up with something better. Unfortunately, brain-scanning technology is still a very long way to go before it reaches the precision and accuracy required for this, but meanwhile there are undoubtedly other sources of information such as modelling and neurology. Our FORM \longleftrightarrow MEANING analysis of English rhythm and intonation may of course be seen as a similar challenge to fellow linguists.

While working on this paper I became aware not only of the immediate practical advantage of trying to match one’s linguistic work to neurocognition, and vice versa: it also made me realize the theoretical importance of Sydney Lamb’s criteria of ‘neurocognitive plausibility’. Indeed, I became convinced that a FORM \longleftrightarrow MEANING approach needs a third component which I tentatively dubbed NEURICITY (N.E.D: ‘form of activity peculiar to the nerve cells’). However, the reader will have noticed that vocal, (other) bodily and mental ‘gesturing’ can be seen as one *single* phenomenon, in which case the wider term PHYSIOLOGY would seem to be more appropriate.

This train of thought seems ultimately to lead to a FORM \longleftrightarrow MEANING \longleftrightarrow PHYSIOLOGY \longleftrightarrow FORM... approach—in other words a concentric or ‘Full Circle’ linguistics. Not only would this bring in bodily gesture as part of language, it would relate the individual mind and body to each other and to the social, conventional aspects of

language: meaning, syntax, lexis, phonology and pronunciation. As an Abercrombian phonetician I am delighted to see that this would also put old-fashioned articulatory phonetics, nowadays regarded as marginal or even irrelevant by most linguists and phoneticians alike, right back into linguistics, where it belongs. It seems that the views of the first and last Lacus presidents are bringing us full circle.

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DALAM IN MALAY: AN IMAGE SCHEMA PERSPECTIVE¹

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DEMPWOLFF (1938, cited by Blust 1997:43) investigated the meanings of **dalem* in the Proto-Malayo-Polynesian languages such as in the Philippine and Malay dialects. From his studies, he discovered two meanings for **dalem*—‘inner surface’ and ‘deep’. This paper investigates the semantic equivalent to this term in Malay, *dalam* [da.lam]. Blust (1997:44) mentioned in his paper that the examples of *dalam* with ‘the meaning “deep”’, that he had collected ‘do not refer to e.g. deep holes, or other solid structures, but generally to deep water’. In this paper, this meaning exists and the ‘depth of concrete (and abstract) three-dimensional objects’ can be represented using image schemata. Image schemata were defined by Lakoff (1987:267) as ‘relatively simple structures that constantly recur in our everyday bodily experience’. This theory suggests that our bodily experience can be represented using geometrical representation.

There are three sources for the Malay data in this paper. First is the 17th century manuscript *Sejarah Melayu* ‘The Malay History’ compiled in the Malay Literature Concordance, Australian National University, Canberra, Australia. The second source comes from the Internet postings of a Malaysian newspaper *Berita Harian* ‘Daily News’. A search with the term *dalam* was carried out in *Berita Harian* news articles published between May and December 2002. The third source is obtained through Internet search engines such as Google.

Through observing the semantic and historical usages of the term *dalam*, this paper traces the historical changes of the term *dalam* by examining its use in the 17th century through to contemporary Malay. In addition, this study also outlines the polysemous meanings of *dalam* and their meaning extensions. These polysemous meanings of *dalam* are presented using geometrical representations. The findings of this paper support the view that our spatial knowledge can be represented using image schemata.

1. PREPOSITION, IMAGE-SCHEMATA AND POLYSEMY. In describing a relational expression such as a preposition, Langacker (1998:10) used the terms trajector (TR) and landmark (LM). The figure of which the location is indicated is the trajector whereas the reference point specifying the location is the landmark.

Using something parallel to the TR-LM prepositional relationship, Brugman (1981) investigated the different senses of the English preposition *over*, which were described via geometrical representations. Lakoff (1987:420) refined Brugman’s analysis by using the theory of image-schemata. He added the Image-Schema Transformation theory, a theory which proposes that the relationships between schemata are experientially based. For instance, in this theory, the image schema of ‘multiplex-mass

transformation' was created—i.e. as one moves further away from a group of individuals, at a certain point they 'begin to be seen as a mass' (Lakoff 1987:442). This transformation theory makes it possible to explain prepositions such as *among* and *between* as part of one's bodily experience. This aspect of the image schema was also emphasized by Johnson (1987:29), who defined schema as an experience-grounded (or embodied) image. Image schema was defined as 'a recurrent pattern, shape, and regularity' in and of 'actions, perceptions and conceptions' that are on-going.

Polysemy, in its simplest meaning, is 'the association of two or more related senses with a single linguistic form' (Taylor 1995:99). Some scholars argue that the identification of polysemous words should be based on a list of criteria. These criteria are given in (a)–(c):

- (a) The polysemous senses of a word must have 'a clear derived sense relation between them';
- (b) The polysemous words must be related to some similar original source etymologically; and
- (c) These polysemous words must belong to the same syntactic categories (Lyons 1977:550).

Cognitive linguists, however, are of the view that 'a word with a number of polysemic senses is regarded in which the senses of the words (i.e. the members of the category) are related to each other by means of general cognitive principles such as metaphor, metonymy, generalization, specialization, and image-schema transformation' (Cuyckens & Zawada 1997:xiv).

In this paper, the examination of the term *dalam* shows that polysemous meanings can occur with differing syntactic categories as well. In the following section, the syntactic structures of *dalam* are outlined, followed by its distribution patterns.

2. *DALAM*. Example (1) is taken from the classical manuscript *Sejarah Melayu* (SM).

- (1) ...*jika dalam paya yang dalam, atau duri yang semak,*
 if DALAM swamp REL DALAM or thorn REL bushes
 'If (it is) inside deep swamp or within thorny bushes...' (SM 99:15)

The first and second *dalam* show different grammatical as well as semantic functions. The first appears before the noun *paya* 'swamp', and the second appears after the relativizer *yang*. The flexibility of *dalam* to perform different semantic and syntactic functions displays its richness in meanings. In addition to the two syntactic structures in (1), *dalam* is also found in other environments, as in (2).

- (2) ...*hendaklah engkau diam di dalam hutan;*...
 must-LAH 2SG.NOM quiet LOC DALAM jungle
 '...you must be quiet in the jungle...' (SM 178:29)

Distribution Patterns of <i>Dalam</i>	Syntactic Categories
(i) MEN + DALAM + KAN or MEN + DALAM + I	Verb
(ii) DALAM (+ Noun)	Noun
(iii) {di, ke, dari, kepada, etc.}LOC + DALAM (+ (Noun)	Noun
(iv) DALAM + Noun	Preposition
(v) DALAM + NYA + Noun + {itu, ini}Demo. Pro.	Adjective
(vi) Noun Phrase + {sangat, tidak}ADV + DALAM	Adjective
(vii) Verb + DALAM	Adjective
(viii) Noun + YANG + DALAM ADJ	Adjective
(ix) PE + DALAM + AN	Noun

Table 1. Distribution patterns of *dalam* in a sentence.

The *dalam* in (2) occurs after *di*. Blust (1989:198) referred to this use of *dalam* as a locative expression or specifier, whereas *di* (and other markers of similar functions) were called prepositions or generic markers of location. However, in order to avoid confusion, this paper refers to markers in the position of *di* above as locative markers.

From (1) and (2), *dalam* is seen to occur a) before noun; b) after the relativizer *yang* and c) after locative markers such as *di*. These possible distribution patterns of *dalam* are included in **Table 1**.

In **Table 1**, *dalam* is shown to function as preposition, noun and adjective. The uses of *dalam* in examples (1) and (2) earlier constitute different parts of speech. In (1), the first *dalam* is a preposition whereas the second is an adjective. The first *dalam* means ‘inside’ or ‘below (a surface)’ while the second means ‘deep’ (iv). The second *dalam* is preceded by the subordinator *yang*, which is equivalent to ‘that is’ (viii).

In sentence (2), *dalam* appears after the locative marker *di* (equivalent to English ‘at’ or ‘in’). In this paper, *dalam* with a preceding *di* (and other locative markers) is considered a noun. Without this marker, as in the first *dalam* in (1), it functions as a preposition. Other evidence to support the differing categorization of *dalam* as preposition and noun is seen in the work of Nik Safiah Karim *et al.* (1997:402-3). In their categorization, the term *dalam* was grouped under the category of directional terms such as *timur* ‘east’, *barat* ‘west’, *utara* ‘north’ and *selatan* ‘south’ in Malay. In addition, *dalam* also falls under the same category with terms such as *bawah* ‘below’ and *belakang* ‘behind’, which act as nouns in the presence of locative markers.

In **Table 1**, line iii, as well, *dalam* can be used with or without a noun after it, as in *di dalam rumah* (LOC + noun + noun) ‘inside the house’ or *di dalam* (LOC + noun) ‘inside (something)’. In old Malay, the term *dalam* itself can mean the palace, which further supports its syntactic category as a noun.

In our data, *di* and *ke* are the two recurring locative markers when *dalam* is concerned. The function of *di* and *ke* is as Huumo (1996:265) states: ‘the primary function of locative adverbials is to introduce different types of space, scenes, or backgrounds, in relation to which elements in the sentence are perceived’. These locative markers are essential in determining the difference between *dalam* as noun and preposition.

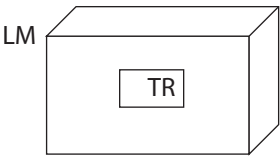


Figure 1. Schema 1.

3. *DALAM* AND IMAGE SCHEMATA. Using the theory of image schemata, this paper posits the following meanings of *dalam*:

<i>dalam</i>	Image Schemata	Meanings
Schema 1	CONTAINER	Inside a three-dimensional space
Schema 2	NEAR-FAR	Far from the side of a boundary
Schema 3	MASS-COUNT	Among; in between

3.1. SCHEMA 1: INSIDE A THREE-DIMENSIONAL SPACE. We interpret examples such as (1) (reproduced as (3)) as Schema 1. Unlike Dempwolff’s (1938) analysis, entities such as sea and swamp are considered three-dimensional objects instead of two-dimensional (planar) surfaces. Hence, example (4) also represents Schema 1, despite its different syntactic category.

- (3) ...*jika dalam paya yang dalam, atau duri yang semak*,
if DALAM swamp REL DALAM or thorn REL bushes
‘If (it is) inside deep swamp or within thorny bushes...’ (SM 99:15)
- (4) ...*masuk ke dalam laut*
enter LOC DALAM(noun) sea
‘...go into the sea...’ (SM 13:32)

The meaning of *dalam* as ‘under a planar surface’ was discussed by Dempwolff (1938, cited in Blust 1997:43). Dempwolff pointed out the difference between *dalam* (as in *dalam laut* ‘“inside” the sea’) and the meaning of ‘inside’ in English. In this paper, this difference can be distinguished when example (4) is interpreted as a noun whereas an example such as ‘*inside* the sea’ in English requires a prepositional phrase: ‘in (*the depths of*) the sea’. Other examples reflecting Schema 1 are shown in (5) and (6), both of which refer to the ‘depth’ of the sea. The notion of ‘depth’ involves length, width and height, which indicate that the instances in (5) and (6) cannot refer to ‘planar surface’ only.

- (5) ...*kolam yang dalam...*
pond REL DALAM(adj.)
‘... a deep pond...’
- (6) *Dalam kolam itu ialah 4 meter.*
DALAM(noun) pond that is 4 meters.
‘The depth of the pond is 4 meters.’

The issue now is why Blust (1997:44) denied the use of **dalem* to indicate a ‘bounded three-dimensional region of space (such as a house)’. When the use of *dalam* is looked at in *Sejarah Melayu*, the following example is found.

- (7) ...*maka peti Raja Suran itu jatuh ke dalam*
 then case King Suran that fall LOC DALAM (noun)
bumi yang bernama Dika...
 earth REL with-name Dika...
 ‘Then the case of King Suran fell onto the world called Dika,’ (literally, ‘Then the case of King Suran fell into the earth that is called Dika.’) (SM 13:36)

The use of *dalam* in (7) could occur in a legend, in which the semantics of the sentence means ‘There were a lot of “earths” and the case of King Suran fell onto one that was called *Dika*.’ According to Blust’s (1997) and Dempwolff’s (1938) proposals, *dalam* in example (7) means ‘on the planar surface’ of *bumi* ‘earth’. This might seem to justify the existence of a two-dimensional schema for *dalam*.

The present paper, however, argues that example (7) involves a three-dimensional volume. There are two main reasons. First, the word *bumi* ‘earth’ is ambiguous. *Bumi* can mean ‘the planar surface of earth under our feet (i.e. a metonymy of the ‘globe of earth’), ‘the world’ and ‘the globe of earth’ itself. The latter two meanings are three-dimensional. Only ‘planar surface’ seems to be two-dimensional, but it is a metonymy to the word ‘earth,’ which in itself is still a three-dimensional space.

Second, drawing on Johnson’s (1987) bodily experience schema, the use of language may explain the perceivers’ view of the world. At the time *Sejarah Melayu* was written, the world may have been perceived as a planar surface (hence two-dimensional). However, provided with scientific evidence, people nowadays accept that the world is three-dimensional. Therefore, *dalam bumi* ‘DALAM earth’ can only mean ‘inside the three dimensional space of the earth,’ as indicated by the representation in **Figure 1**.

Regarding Blust’s (1997:44) arguments that the examples of *dalam* with ‘the meaning “deep”’ that he had collected ‘do not refer to e.g. deep holes, or other solid structures, but generally to deep water,’ this paper provides the following examples.

- (8) *Lubang dikorek dengan menggunakan mesin penggerudi ke takat*
 hole PASS-dig with use machine drill LOC level
dalam yang ditetapkan. (Internet source, Google search)
 DALAM (noun) REL PASS-state
 ‘The hole is dug with a drill to the stated depth.’
- (9) *Gunung yang tinggi, jurang yang dalam, lautan yang menghampar*
 mountain REL tall valley REL DALAM (adj.) sea REL stormy
 ‘Mountain that is high, valley that is deep or sea that is stormy...’ (Internet source, Google search)

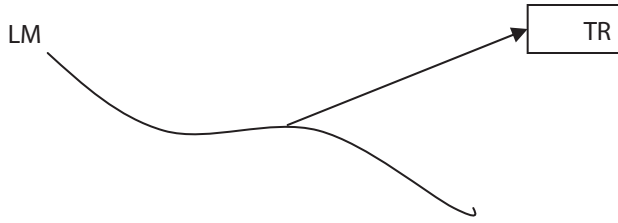


Figure 2. Schema 2.

Both these examples contradict Blust's argument about the notion of depth. The use of *dalam* can refer not only to the depth of the holes but also solid objects, as indicated in (10):

- (10) ...*zat* *yang terkandung* ***dalam*** *kurma*...
 nutrient REL contained DALAM (prep.) date
 'Nutrient that is contained in the dates.... (BH)

This example shows the abstract element 'nutrient' which is inside the fruit *kurma* 'date'. *Dalam* in example (10) clearly denotes the inside of a solid object. It obviously does not refer to a locus below a planar surface. Examples from our data show that Schema 1 explains what was assigned to a 'planar surface' as a metonymy of a three-dimensional space.

3.2. SCHEMA 2: FAR FROM THE SIDE OF A BOUNDARY. Schema 2 originates from the image-schema NEAR-FAR. This use of *dalam* is rather restrictive, as it usually refers to the inner part of the jungle. It usually appears in a lexicalized derivational form of *pedalaman* 'inner land far from the boundary'. Example (11) provides an example for this:

- (11) *Enam lagi bom paip ditemui* ***dalam*** *beberapa*
 six again bomb pipe PASS-found DALAM (prep.) a few/little
peti surat di kawasan ***pedalaman*** *Nebraska*
 case letter LOC area PE-DALAM-AN Nebraska
 'Six pipe bombs were again found in a few mail boxes in the interior of Nebraska' (BH)

From a cognitive perspective, it is not difficult to conceptualize this schema. In most countries (i.e. areas with boundaries), the inner parts are mainly less developed. Among the Malay speech communities, the inner lands usually imply the existence of forests. The fact that they are the middle of an area with boundary, these inner lands are far from the boundary, as indicated in **Figure 3**. With this, the term *pedalaman* is developed from this schema of *dalam*.

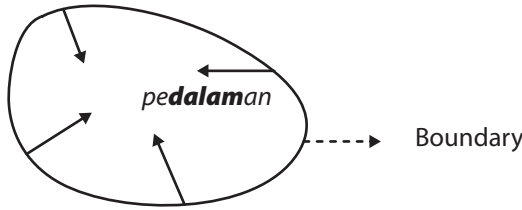


Figure 3. *Pedalaman.*

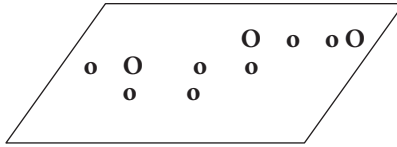


Figure 4. *Schema 3.*

3.3. SCHEMA 3: AMONG, BETWEEN. Schema 3 (Figure 4) has the meaning of ‘among’ or ‘in between.’ This schema is similar to Lakoff’s (1987) MASS COUNT schema as the ‘view from above’ schema transformation. This is seen in example (12) below:

- (12) ...*apatah lagi bagi pasukan-pasukan dalam dua kumpulan lain*
 what more for teams DALAM (prep.) two group other
yang akan menentukan nasib masing-masing esok.
 REL will decide chance respectively tomorrow
 ‘...what more for the other teams of another two groups that are going to
 strive for their luck tomorrow.’ (Internet source, Google search)

The use of *dalam* as a preposition is discussed further in section 4.3. Schema 3 is the only prepositional type of *dalam* that appears frequently in *Sejarah Melayu*. The other uses of *dalam*, as shown in section 4.3, occur more often in contemporary texts such as in *Berita Harian*. Therefore, these meanings (in the following section) are considered meaning extensions of these image-schemata.

4.3. MEANING EXTENSIONS OF *DALAM*. In this section more abstract and metaphorical meanings of *dalam* are seen. The detailed meanings of these uses of *dalam* are shown in Table 2 (overleaf) along with their possible image-schemata.

Meanings (a) to (c) have mappings from space to time: (a) and (b) originate from the PATH schema in which the notion of duration is seen the distance between two points. Since Schemata 1 to 3 do not represent the PATH schema, it is suggested as an extension from the NEAR-FAR schema (i.e. Schema 3). Figure 5 (overleaf) explains this extension.

Figure 4 shows that, from the perspective of the perceiver, the inner land is far. Similarly, in the notion of time, the present is here and the future is far. The present and the future form the schema of PATH, which is expressed in (a) and (b) in Table 2. An example of (a) is shown in (13).

Meanings of <i>Dalam</i>	Image-schemata
(a) during; within a duration	Verb
(b) while; in the process of	Noun
(c) (be) at the stage of	Noun
(d) inside, within, (an organization, a family, a matter, program, context, issue, report, etc.)	Preposition
(e) in the state of (emotion, sadness, quietness, etc.)	Adjective
(f) not little; more than what is enough	Adjective
(g) profound	Adjective
(h) inner; internal; not obvious from outside	Adjective
(i) (literal) palace area; royal	Noun

Table 2. Other meanings of *dalam* and their possible image-schemata.

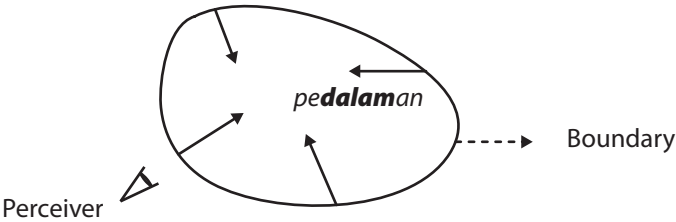


Figure 5. NEAR-FAR schema.

- (13) ...*kerana jika patik tiada keluar dalam bulan ini...*
because if 1SG.NOM (servant) NEG go out DALAM (prep.) month this
‘...because if I do not go out during this month.’ (SM 208:36)

The meaning of (b) in **Table 2** occurs in examples such as (14).

- (14) *Dalam mempertahankan kecekapan pasaran BSKL, Anuar*
DALAM (prep.) strengthen efficiency market BSKL Anuar
memberikan senarai panjang hasil kajian...
give list long product research...
‘Whilst strengthening the efficiency of the BSKL market, Anuar gave his
long list of research results...’ (BH)

In the process (path) of ‘strengthening the efficiency of the BSKL market,’ something was done. The meanings of examples (a) and (b) are differentiated because *dalam* in (a) denotes a duration but in (b), it denotes a process. Both (a) and (b) differ from (c) where it indicates a LOCATION schema within a path. An example is shown in (15).

- (15) *Dalam tahap ini, pelatihan dan segala kegiatan untuk meningkatkan*
 DALAM(preposition) stage this election and all activity for raise
pengetahuan...
 knowledge
 'At this stage, the election and all activities for increasing the knowledge...'
 (Internet source, Google search)

The other metaphorical extensions, (d) to (i) in **Table 2**, are related to the CONTAINER schema. The CONTAINER image-schema emphasizes the content nature of the items in question. The meaning of (d) refers to the content of an organization, issue, matter, etc. Example (16) reflects this meaning.

- (16) *...pihak tertentu dalam pertubuhan belia didapati lupa*
 side particular DALAM(preposition) organization youth PASS-find forget
daratan dalam usaha meraih sokongan...
 land DALAM(preposition) attempt pull support
 'Certain people in the youth organization have betrayed others in the midst of gathering support.'

The next metaphorical extension is that of (e). This meaning of *dalam* reflects an emotional state such as happiness. The person in this emotional state takes the preposition *dalam*, as in *dalam kegembiraan* 'in the state of happiness'. The following is another example.

- (17) *...maka disuruh baginda kerjakan dalam senyap...*
 then PASS-ask His Majesty work DALAM(preposition) quiet
 '...then (he) was asked to work quietly by the Majesty...' (SM 256:6)

In addition, the meanings of (f) and (g) are extended from the image-schemata of CONTAINER as well. The depth of the three-dimensional space in Schema 1 is now used metaphorically to mean 'the depth of knowledge' or 'the profundity of meaning.' Examples can be seen in (18) and (19):

- (18) *Tanggung jawab pertama yang mesti terwujud pada diri Ahlul Bait*
 responsibility first REL must exist at self Ahlul Bait
adalah memiliki ilmu yang dalam
 is possess knowledge REL DALAM (adj.)
 'A responsibility that must exist in Ahlul Bait himself is to possess knowledge in depth.' (Internet source, Google search)
- (19) *...memberi erti yang dalam kepada sesiapa yang*
 give meaning REL DALAM(adj.) to whoever REL
disahabatinya.
 PASS-befriend-3SG.

‘...(it) gives a deep meaning to whoever (that he) befriended.’ (Internet source, Google search)

In addition to the discussion about meaning extensions between NEAR-FAR and PATH, there are also other examples to support the metaphorical extensions between NEAR-FAR and CONTAINER. For instance, in English, Mandarin Chinese and Malay, there are expressions related to ‘far-sighted’ persons, i.e. someone with deep knowledge.

- (20) English: *Far-sighted*
 Chinese: *shenyuan* ‘deep-far’, *yuanjian* ‘far-see’
 Malay: *Orang yang berpandangan jauh* ‘person REL exist-view far’

All the expressions in (20) refer to someone with profound thoughts, a meaning extension from NEAR-FAR to CONTAINER.

The metaphorical meaning of (h) in **Table 2** is also an extension of the CONTAINER schema. An instance of this meaning is shown in Example (21).

- (21) *Menurut spesialis penyakit dalam dr. E Mudjaddid...*
 according specialist disease DALAM(adj.) Dr. E Mudjaddid
 ‘According to Dr. E. Mudjaddid, specialist in internal diseases...’ (Internet source, Google search)

Here the term *dalam* functions as an adjective that modifies the noun *penyakit* ‘disease’. Unlike the other meanings of *dalam* obtained from the CONTAINER schema, this use of *dalam* omits the container (i.e. the body) to which *dalam* refers. This is probably because the concept of body is automatically evoked by the noun *penyakit* ‘disease’.

The use of *dalam* with the meaning (i) in **Table 2** is classical. *Dalam* in this case denotes either the ‘royal palace’ or the ‘three-dimensional space where the aristocrats met, worked and basically formed the government.’ Hence, it also reflects the CONTAINER schema. Examples (22) and (23) show some of its uses.

- (22) ...*disuruh panggil pada segala orang dalam* ‘Datuk Tuan’ ...
 PASS-tell call to all people DALAM(adj.) ‘Datuk Tuan’
 ‘All the people with the royals were told to call (him) “Datuk Tuan”’.
 (SM 196:33)
- (23) *Setelah datang ke dalam, maka anak raja dan raja*
 after come to DALAM(noun) then children king and king
perempuan pun dimandikan oranglah;...
 female PUN PASS-bathe people-LAH
 ‘After they arrived at the palace, then the Queen and the children of the King were bathed by the servants.’ (SM 258:32)

In (22), *orang dalam* (literally ‘the inside man’) refers to ‘the people with the royals’ (or those who worked or belonged to the King). In (22), *dalam* functions as a noun to mean ‘the place where the King stays.’

From looking at Schemata 1 to 3 and the meaning extensions of these schemata, this paper demonstrates that image-schemata can be captured using geometrical representations. The metaphorical extensions of meanings denote more abstract meanings. Therefore, they are more likely to perform as prepositions.

The work on *dalam* in this paper also supports the view of cognitive linguistics that polysemous meanings are ‘related to each other by means of general cognitive principles such as metaphor, metonymy, generalization, specialization, and image-schema transformation’ (Cuyckens & Zawada 1997:xiv).

5. CONCLUSION. This paper investigates the meanings of the polysemous term *dalam* in Malay and posits three image-schemata to encompass these meanings. These three images-schemata are CONTAINER, NEAR-FAR and MASS-COUNT. Other extended schemata are PATH and LOCATION. This analysis claims that what Blust (1997) and Dempwolff (1938) suggested as ‘planar surface’ for *dalam* only represents part of the three-dimensional entity, i.e. the planar surface is metonymy of the three-dimensional entity. Therefore, there is no two-dimensional schema indicated by *dalam*. This paper argues for this point by using examples from the 17th century manuscript as well as contemporary Malay.

This paper also contributes to the study of prepositions from the cognitive point of view. In tracing the semantic and historical changes of the term *dalam*, this paper also identifies the relationship between the CONTAINER, NEAR-FAR and PATH schemata. From a cognitive perspective, the PATH schema is developed from the NEAR-FAR schema. Therefore, there are the uses of present as near and future as far. The present and future form a path within a certain timeframe. The CONTAINER schema, on the other hand, can also be developed from the NEAR-FAR schema. Cross-linguistically, there are expressions such as ‘far-sighted’ in English and *yuanjian* ‘far-see’ in Chinese, both of which denote that ‘to be able to see further ahead shows depth of thought.’ With these discoveries, the findings of this paper supports the definition of polysemy from the cognitive perspective.

¹ I would like to thank Professor Shuanfan Huang and Professor Kathleen Ahrens of Graduate Institute of Linguistics, National Taiwan University, as well as the reviewers of the *LACUS Forum 30* for their comments and critiques on this paper. Remaining errors are my sole responsibility.

² This paper uses the following abbreviations:

NOM	Nominative	PASS	Passive	REL	Relativizer
SG	Singular	Exist	Existential	NEG	Negation
LOC	Locative Marker	CLASS	Classifier	BH	<i>Berita Harian</i>
DEM	Demonstrative	Num	Numeral	SM	<i>Sejarah Melayu</i>

PREP	Preposition	ADJ	Adjective	Pred.	Predicate
CL	Clause	ADV	Adverb	Pro.	Pronoun

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HOW THINKING DETERMINES LANGUAGE: THE RELATIVITY OF LANGUAGE RELATIVITY

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THE LINGUISTIC RELATIVITY HYPOTHESIS proposes that structural differences among natural languages influence the way their respective speakers think about reality. According to the possibly most famous advocate of linguistic relativity, Benjamin Lee Whorf (1956:212–13) the '[f]ormulation of ideas is not an independent process... but is part of a particular grammar, and differs, from slightly to greatly, between different grammars'. Although not always stated explicitly, the argument is usually assumed to be uni-directional: language infiltrates thinking, not the other way round. Contemporary empirical evaluations of linguistic relativity can be broadly classed into three types: a *structure-centred approach* beginning with an observed difference between languages and seeking evidence for their impact on thinking, a *behaviour-centred approach*, which attempts to explain a marked behavioural difference between speakers of different languages with dissimilar language practices, and a *domain-centred approach*, which looks at a specific area of cognition and then compares the respective encoding conventions in different languages, and their possible influence on behaviour (Lucy 2001:13488–89).

Domain-centred studies have, amongst others, examined colour perception, quantity awareness and spatial reasoning: Kay and Kempton (1984) found that verbal colour distinctions enhance the ability to categorize and memorize colours. Lucy (1992:23–84) demonstrated that memorizing quantities was facilitated by a vocabulary for number distinctions. Levinson and Schmitt (1993) found that speakers of languages which used body co-ordinates for spatial reasoning replicated a layout of three toy animals differently from those who spoke languages which predominantly used cardinal or topographic features to describe spatial arrangements. Kita and Özyürek (2003) found that the gestures of speakers of different languages depended on the vocabulary their languages provided. When asked to describe a cartoon depicting a bird swinging on a swing speakers of English drew a curved line in the air to illustrate the movement. Turkish and Japanese-speaking participants, however, made straight horizontal back and forth movements in the same task, according to the authors because their respective languages lack a verb meaning 'to swing'.

However, other studies failed to find group effects when comparing the behaviour of speakers from two structurally distinct languages. Papafragou, Massey and Gleitman (2002:199–13) compared the reasoning about motion by native speakers of English and Greek, languages which differ strongly in the encoding of manner and direction of motion. While the participants' verbal descriptions of line drawings

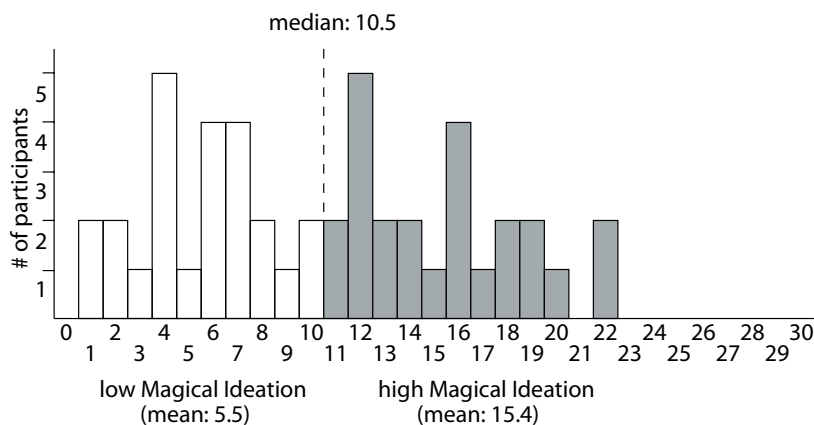


Figure 1. Distribution of Magical Ideation scores of the 48 participants.

illustrating movement differed, their performance in a non-linguistic recognition task involving the same pictures or similar ones depicting either a path or a manner change did not. The speakers of both languages attended to these features to the same degree. Thus, according to the authors, 'the lexical patterning of the specific languages did not bleed into subjects' performance in tasks that do not call on the linguistic categories specifically' (2002:213). Furthermore, the results of many studies which did find language-group effects also revealed considerable variance within the groups and even within individuals across trials. Levelt (1996:99) found that less than one in four Dutch speaking participants consistently used the same frame of reference for spatial descriptions.

It may be speculated that such within-group but between-subject differences reflect disparities in their respective past or present language environments, e.g. exposures to a dialect or a second language. However, it may also be hypothesized that such differences between individuals reflect contrasts in thinking patterns which are not merely the outcome of different forming through language, i.e. that language-independent thinking styles influence behaviour, including the use of language.

One way to investigate the possible influence of different preferred styles of thinking is to compare the linguistic performance of two groups which are dissimilar in one quantifiable characteristic for which no claim has been made that it is determined or strongly shaped by the person's linguistic experience. An area which lends itself as a basis for such an investigation is schizotypal thinking, i.e. the degree of proneness to schizophrenic-like reasoning about reality. In samples drawn from a normal population from a single language group it is common to find both highly skeptical thinkers who dismiss any reasoning which contradict conventionally accepted forms of causality and strong believers in supernatural phenomena and analogous sensations as well as persons with intermediate scores (for the distribution pattern of the population from the study presented below see **Figure 1**). Idiosyncratic belief formation has been proposed to be an effect of overinterpretations of the synchronicity of

co-occurring events and an urge to build links between concepts. A right-hemispheric processing bias has been suggested as an underlying cause for such increased association-building (Leonhard & Brugger 1998:180). The authors' hypothesis is based on their own and previous laterality research, which showed that the left hemisphere tended to be better at detecting links between closely related concepts, whereas the right hemisphere was superior in discovering associations between distant concepts. They found that performance differences between persons with, respectively, high or low schizotypy scores in lateralized tests were usually significant only in the right but not in the left hemisphere.

If idiosyncratic belief formation is indeed an expression of being 'driven by the power of coincidence', as Skinner (1977) formulated it, differences in semantic processing should be observable, supporting the notion that thinking may influence language, rather than being a mere slave of linguistic framing. In order to assess possible differences in semantic processing, a test design was chosen which assessed both divergent and convergent thinking. The two terms, which were coined by J.P. Guilford in the 1950s, refer to the ability to generate new ideas (divergent thinking) and to reality test them (convergent thinking) in order to determine if they will work (Gale 1998).

1. METHOD.

1.1. PARTICIPANTS. 25 women (aged 20 to 48 years, mean: 27.4; 12 to 24 years of education; mean: 16.7) and 23 men (aged 20 to 49 years, mean: 31.5; 12 to 24 years of education, mean: 17.4), all right-handed and with no history of neurological or psychiatric illnesses took part in this study. All participants were native speakers of Swiss or Standard German and had been recruited via blackboards, predominantly in university environments. They were not offered any form of payment and all provided written consent to participate.

1.2. TESTING INSTRUMENTS AND PROCEDURE. *Handedness* was assessed using the 13-item manual preference questionnaire by Chapman and Chapman (1987). For every one of the questions (e.g. With which hand would you throw a snowball to hit a target?) the participants state whether they use their right hand (one point), either hand (two points) or their left hand (three points). Right-handedness is defined as an overall score of not more than 17. Handedness was controlled for, as it is known to correlate with hemispheric dominance for language processing (Hartje 2002:69–75).

Schizotypy was assessed using Eckblad and Chapman's (1983) Magical Ideation Scale (MI), a 30-item questionnaire about hallucination-like experiences (e.g. 'Some people can make me aware of them just by thinking about me'), belief in supernatural phenomena (e.g. 'I have worried that people on other planets may be influencing what happens on earth'), and conventionally invalid forms of causation (Duchêne, Graves & Brugger 1998:58). The MI scores served to group the participants into a low magical ideation (score < median) and a high magical ideation group.

The *Word Halo Test* (WHT, Armstrong & McConaghy 1977) was used to quantify *divergent* thinking. In this task, subjects were given a target word and five near-synonyms as in (1) and were asked to mark those words which they perceived as being equal or almost equal in meaning to the target. Any choice from zero to all five items was possible.

- (1) *great*: huge – world-wide – infinite – precious – intense¹

As no German version of the WHT had been available, an initial set of 44 items was created using entries from a thesaurus (Radzuweit & Spalier 1982). The order of the near-synonyms taken from the thesaurus was randomized for every item to ascertain that synonym position and semantic distance to the target word did not correlate. Unlike the original version of the test, only nouns were used as stimuli. The initial set of items was given to 31 participants in a pretest. For the main experiment those 20 items of the pretest were selected which had shown the highest variance with respect to the number of selected synonyms.

The *Remote Associates Test* (RAT, Mednick 1958), which was advertised by its author as a general measure of creativity, served as the basis for the assessment of *convergent* thinking. Subjects were offered three unrelated words, as in (2):

- (2) magic – board – death²

The task was to provide a matching fourth word, which could be associated with all three stimuli (e.g. black). As with the WHT, no German language samples had previously been developed. Therefore, an initial list of 45 noun-based items was created and subsequently reduced to 35 by two reviewers. Then, a pretest version of the RAT was carried out with twelve individuals who did not take part in the later experiment. After attempting the 35 items, they were told the expected solutions asked if they had found the them to be comprehensive. These quantitative and qualitative data were used to eliminate problematic items, e.g. those containing regionalisms or items for which the same non-expected answers had been provided by multiple participants. The remaining items were then classified as easy, medium or difficult, according to the number of correct replies. For the main experiment, four simple, ten medium and six difficult experimental as well as three trial-run items were selected. Alternative solutions which had been provided by the participants were evaluated by three examiners. One such reply was found to provide plausible associations to the corresponding three stimuli.

2. RESULTS. A one-factor analysis of variance revealed no significant differences between men and women for age, number of years of education, handedness, RAT, Word Halo or Magical Ideation. The mean MI value of the 25 women (11.6, SD = 6.3) did not differ significantly ($t_{46} = -1.50$) from the mean of the 23 men (9.1, SD = 5.1).

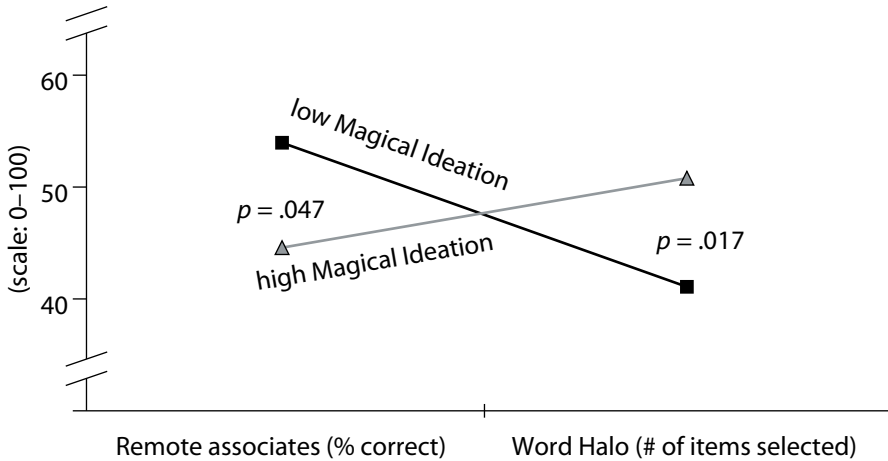


Figure 2. RAT and WH results for persons with high and low magical ideation.

The low MI (14 men, 10 women) and the high MI groups (9 men, 15 women) did not differ significantly with respect to sex ($\chi^2_1 = 2.09$), age ($t_{46} = -.04$) or number of years of education ($t_{46} = -.092$). Two-factor (sex and MI group) analyses of variance were carried out for the Word Halo and the RAT results. In both cases only a significant main effect for the group was found: In the Remote Associates Test the subjects scoring low on the MI Scale outperformed the highly magical group ($F_{1,44} = 4.17$, $p = 0.047$). And in the Word Halo Test, persons scoring above the MI median selected significantly more of the offered near-synonyms ($F_{1,44} = 6.94$, $p = 0.017$; see **Figure 2**).

3. DISCUSSION. The results of the Word Halo Test are in line with the findings by Lovibond (1966, in Armstrong & McConaghy 1977:439–40), who reported that persons demonstrating broad word halos also tended to define unusual and often inappropriate categories in the Object Sorting Test, in which objects which belong together have to be grouped accordingly. Armstrong and McConaghy suggested that both results reflected an ‘allusive’ style of thinking, a term they had coined for loose and unclear abstract thinking.

A connection between paranormal belief and association tendencies in a language task had previously been documented by Gianotti et al. (2001). In their bridge-the-associative-gap test, subjects who scored at the extreme ends of the Magical Ideation Scale had to provide a word that acted as a bridge between two given concepts (e.g. *foot* for *leg* and *shoe*). Only half of the items provided actually consisted of such indirectly linked concepts. For the non-related stimuli pairs, the high-scorers—the believers—made significantly more original (in the sense of infrequent) suggestions.

At first sight, the lower performance of the high magical thinkers in the Remote Associates Test seems to contradict the suggestion that schizotypal thought matches an increased tendency to associate distant or unrelated concepts. It is nevertheless

proposed that the observed double dissociation between WH and RAT results in high and low magical thinkers reflect the same underlying difference: persons scoring high on the MI scale generally showed a more pronounced spreading activation of semantic concepts, triggered by both the WH and the RAT stimuli. In the WHT this more intense divergent thinking process led to the acceptance of more near-synonyms. In the RAT, however, the activation of a multitude of related concepts seemed to impair their overall problem solving abilities. Presumably, they were less well able to inhibit further divergent processing in a way so that only concepts which were related to all the stimulus items retained a sufficient level of activation. In short, in comparison to low-magical individuals, highly magical thinkers on average are good in divergent but poor in convergent thinking.

It must be pointed out that the presented results stem from an investigation in the relationship between magical ideation and creativity. Possibly, the linguistic background of the participants was not rigidly enough controlled to prevent artefacts in the semantic processing data. Nevertheless, it seems unlikely that e.g. foreign language knowledge systematically influenced the outcome. Also, the groups of high and low magical thinkers were similar in every aspect which was measured.

The findings may be of value in two areas. Firstly, investigations in language relativity finding within-group variance may need to look beyond structural idiosyncrasies of the languages under investigations to explain such heterogeneity. Secondly, pre-onset differences in preferred thinking styles may in part explain the very different recovery patterns often found in clinical linguistic studies when comparing individuals with similar aetiologies.

Overall, the observed double dissociation in divergent and convergent thinking in persons with low and high magical ideation respectively suggests that a person's language may indeed be under the influence of a preferred thinking style, i.e. that to some extent thinking determines language.

¹ Example from Armstrong and McConaghy's (1977) original English-language test.

² Example from Mednick's (1958) original English-language test.

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THE ROLE OF BODY IN EMOTION METAPHORS

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EACH CULTURE HAS ITS OWN UNIQUE WAY of modeling the body, which often serves as the base for the figurative language about many other topics. Emotion is one such topic that many languages conceptualize via a large number of metaphors and metonymies involving body parts, bodily events and processes, body heat, internal pressure, etc. (Lakoff 1987), and a large part of our emotional understanding seems to be based on these metaphors and metonymies. The emotion concepts and metaphors have received serious attention from researchers in linguistics and cognitive linguistics (Lakoff & Johnson 1980, Lakoff 1987, Langacker 1991, Kövecses 1990, 2000), who have discussed and explored the way people understand their emotions and added to our understanding of the general structure of our conceptual system. In his study of metaphor and emotion, Kövecses (1990) critically assesses prior and current semantic theories on the conceptualization of emotion metaphors in English and some other languages and proposes that the emotion categories should be defined by prototypes instead of collections of features or minimal definitions of core meaning. The prototypes can be represented in terms of cognitive models which arise mainly from conceptual metaphors and metonymies that reflect our folk understanding of emotional categories. He regards cognitive models as propositional and image-schematic knowledge, and argues that a 'major advantage of conceiving of emotion concepts as prototypical cognitive models is that the prototypical models capture a large number and perhaps the (culturally) most important of our emotional experience' (1990:214).

Like English and many other languages, Chinese is exceptionally rich in its metaphorical and metonymical expressions for emotion which originate in the domain of body parts, especially the heart (and other internal organs) due to an association between the folk theory of the human body and its physiological functions. The present article explores and discusses conceptual metaphors and metonymies for emotion in the Chinese language with regard to the role of body, since the figurative language not only pervades daily expressions people use for emotion, it is also essential to the understanding of most aspects of the conceptualization of our emotion and emotional experience. The view of emotion concepts and metaphors the present study subscribes to is that of cognitive models outlined in Kövecses (1990, 2000).

1. CULTURAL FACTORS UNDERLYING THE ENCODING OF EMOTION. Emotion is commonly described as *qi qing* 'seven feelings' in Chinese. This is the number of basic human emotional feelings: *xi* 'joy', *nu* 'anger', *bei* 'sorrow', *ju* 'fear', *ai* 'love', *hen* 'hate' and *yu* 'desire'. The popular folk theory holds that all seven emotional feelings have

effects, usually bad, ill or negative, on one's internal organs, especially the heart, and hence all emotional feelings should be put under control. The folk theory is deeply rooted in traditional Chinese medicine, which considers emotion in general as disease or psychological instability and hence the source of the ailment of the body and the internal organs. Since traditional Chinese medicine has been practiced for thousands of years and often worked wonders, its views and knowledge have permeated the Chinese culture. With the traditional medicine as a guide, Chinese people seem to have a folk understanding of the relationship between bodily functions and emotion. For example, worry may hurt one's stomach and spleen, fear may harm one's gallbladder, anger may damage one's liver, and sorrow may destroy one's heart, etc. The traditional medical view has laid the foundation for the folk understanding of the correspondence between emotion and physiology, and the folk theory, in turn, has led to abundant conceptual metaphors and metonymies furthering this understanding. The following hyperbolic expressions, for example, give us a glimpse of the crucial link between internal organs and the conceptualization of emotion.

- (1) *qi zha-le fei*
anger explode lungs
so angry that one's lungs explode
- (2) *xia po-le dan*
scare break gallbladder
so scared that one's gallbladder ruptures
- (3) *shang tou-le xin*
hurt thorough heart
so sorrowful that one's heart breaks

Indeed, the majority of emotion metaphors and metonymies originate from the domain of internal organs and they often indicate that emotional forces are typically dangerous and destructive. Other body parts such as the face, the facial organs, the limbs, etc. are also used in the metaphorical language of emotion in Chinese, specifically in the display of emotion, as shown in the following metonymies:

- (4) *shou wu zu dao*
hand dance feet dance
one's hands and feet dance (indicating joy)
- (5) *mei-mu chuan qing*
eyebrow-eye pass love
to express love with one's eyes and eyebrows (i.e., expressing love implicitly)

Nevertheless, these body parts play a less important or secondary role and are used much less frequently in encoding emotion than the heart (which often extends to refer to all internal organs) in the conceptualization of emotion, because the Chinese culture does not usually encourage one to express or display one's emotional feelings

openly. Ancient Chinese philosophy, especially Confucianism, advocated keeping up morality, controlling emotion and resisting desires, because unrestrained emotion and desires would gradually drown one's conscience and morality, and overcome the good (Wang 1994). As a result, Chinese culture regards self-control as a virtue and keeping calm or hiding one's emotions as a worthy ability. The advocacy of suppressing emotion and maintaining control can be readily seen from the following sayings:

- (6) *bu-yao zuo gan-qing de nu-li!*
not-want be emotion slave
Do not be a slave to one's emotion.
- (7) *yao xue-hui kong-zhi zi-ji-de gan-qing!*
want learn control self emotion
Learn to control one's feelings.
- (8) *yong lizhi zhan-sheng gan-qing!*
use reason fight-win emotion
Make reason overpower emotion.

The view of the inferior nature of emotion, the passive role of people in emotion, and the disruptive force of emotion is not unique to Chinese culture, since 'in the whole history of Western thought the emotions have been treated as the "lower" parts of the human soul, what we share and inherit from the animals, while it is reason that makes us human, even "a spark of the divine" ' (Solomon 1981:35). We suffer from our emotions. For example, people are *struck by jealousy, crushed by shame, paralyzed by fear, overwhelmed by guilt* and *plagued by remorse*. Likewise, the idea of control is expressed in Western cultures: '[some people] connect the emotion and morality domains in such a way that they conceive of their emotions as forces of temptations, thus seeing their emotions as dangerous or even evil forces that they should resist' (Kövecses 2000:198).

While it seems that emotion is more universally regarded as inferior in nature and disruptive in force, Western cultures differ from the Chinese culture in their view and treatment of emotion with regard to the display and discharge of emotional feelings. The former seems to view the display of emotion as a healthy act both psychologically and physiologically, as seen in the Freudian terminology of emotion such as 'catharsis', 'sublimation' and 'vicissitudes' (Solomon 1981); the latter, however, emphasizes the containment of emotion in the heart, and the damaging force of emotion to the heart. The Chinese folk theory of the physiological effects of emotion on the body, especially the heart, with its roots in traditional Chinese medicine, forms the basis of the most general and unique metaphor for emotion: HEART AS CONTAINER FOR EMOTION. In the following sections, I examine and explore the association of the heart with Chinese metaphors and metonymies for emotion, i.e. how abstract domains of emotion are structured by means of projection from a more concrete domain of the heart. The study of linguistic expressions which refer to parts of the body and their

functions may thus contribute to a clearer understanding of how physical experience is projected onto linguistic action.

3. HEART AND EMOTION. A look at the Chinese characters that encode basic human emotions reveals an interesting association between the conceptualization of emotion and the heart domain. In general, most Chinese characters indicating emotions are compound characters, typically consisting of a phonetic component and a semantic radical – *heart*. For example:

- 怒 (*nu* ‘anger’), a compound character with the semantic radical *xin* ‘heart’, indicating that anger has to do with one’s heart. Another common character standing for anger is 愤, whose semantic radical is also a heart.
- 悲 (*bei* ‘sorrow’), a compound character with the semantic radical *xin*, indicating the relationship between sorrow and the heart. Another idiomatic expression for sadness and sorrow is 伤心, literally ‘hurt-heart’
- 惧 (*ju* ‘fear, shock’), a compound character with the semantic radical *xin*, indicating a correspondence between fear and one’s heart. Other common characters standing for fear are 怕 (*pa*), 惊 (*jing*) and 恐 (*kong*), all of which have *xin* as their semantic component.
- 爱 (*ai* ‘love’), a compound character with *xin* as its semantic radical. It is a simplified version of the original 愛, which also has *xin* as a semantic component. One of the compound words commonly used in Chinese to express *love*, *beloved*, or *treasure* is 心爱, which is literally translated as ‘heart-love’.
- 喜 (*xi* ‘joy’) a compound character with *xin* as its semantic component. The original pictograph of the character is composed of a drum (the upper part) and a mouth (the lower part), indicating a lively scene of laughter and drumming, hence meaning joy or happiness. Also, 喜 can be written with an added heart at the left or the bottom of the character as its semantic radical (cf. *A Comprehensive Dictionary of Chinese Characters* 1995), suggesting that the heart plays a role in joy. Another common character for joy/happiness is 悦, again with a semantic radical of *xin*.

In fact, of about 1,100 characters with the heart as the semantic radical in *A Comprehensive Dictionary of Chinese Characters* (1995), 60% indicate human feelings and emotions of joy, anger, sorrow, fear, love, hate, desire, shame, surprise, pride, worry, etc. Moreover, the Chinese word for emotion can be a compound character 情 (*qing*) or a compound word, 感情 (*gan-qing*), both having the heart as their semantic component.

The concept of the heart seems to be ubiquitous in the Chinese language of emotion because the ancient Chinese considered the heart the center of one’s body, as shown by the character *zhong* (literally ‘center’), which has been used metonymically for the heart (see (10) below). The heart metaphor and metonymies for emotion are abundant in Chinese, and many of them have become idiomatic expressions. For example:

- (9) *nu cong xin qi*
 anger from heart derive
 Anger rises from the heart
- (10) *bei cong zhong lai*
 sorrow from heart come
 Sorrow comes from the heart

The following section shows how the Chinese language makes a principal use of the heart in the conceptualization of some emotional feelings. While discussing the conceptualization of emotion in Chinese, I illustrate each of the conceptual metaphors with linguistic examples, all of which are taken from native speakers' daily conversations, and contemporary Chinese short stories and novels as well as Chinese dictionaries.

4. THE CONCEPTUALIZATION OF THE HEART CONTAINER METAPHOR. As demonstrated by several major studies (Lakoff & Johnson 1980, Lakoff 1987, Kövecses 1990, 2000, *inter alia*), emotion has an extremely complex concept structure which brings about a wide variety of non-trivial references. In this section, I focus on the conceptualization of emotion in the Chinese language and its cultural setting, based on the cognitive framework set up by the above-mentioned research, and try to show that underlying the Chinese language of emotion there is a coherent conceptual organization, where the *heart* is at the heart of metaphorical and metonymical expressions.

In explaining how metaphors are used in the understanding of a variety of emotional experiences, Kövecses (1990:47) states,

Conceptual metaphors involve two concepts, one of which is typically abstract and the other typically concrete. The more difficult (i.e. the more abstract) concept is called the 'target domain', and the concept in terms of which we try to understand this concept is called the 'source domain'. Not only the target domain but also the source domain can be characterized by several (prototypical and non-prototypical) cognitive models, or schemas.

Hence we have the CONTAINER metaphor of emotion in English, i.e. the body is a container for emotion, where the container is the source domain and emotion the target domain. The following exemplifies the container metaphor in English.

- (11) She was filled with emotion.
 (12) She felt emotionally drained.
 (13) He bottled up his emotion.
 (14) He overflowed with emotion.
 (15) He gave vent to his emotions.

These examples portray emotion as a fluid/substance in a container (the body), which defines an intensity scale for the emotions. When a person is very emotional, the

container is full (11), when she lacks emotion, the container is empty (12), when he tries to control his emotion, the container is closed (13), when the emotion gets more intense, the container is overflowing (14), and when the emotion gets too intense, it has to be released (15). It seems that the CONTAINER metaphor of emotion can map all the parts of the container domain onto the corresponding parts of emotion domain, and this single conceptual metaphor gives considerable structure to the diffuse and vague notion of emotion.

Much like English, emotion is in general conceived as a force/substance in Chinese that can be either contained or become uncontainable in the body. However, Chinese metaphors and metonymies express more specifically the HEART IS A CONTAINER FOR EMOTION, which characterizes the source of the emotions as coming from the heart as well as the heart as the container. For example:

- (16) *xin-zhong-de nu-qi*
 heart-in anger
 the anger in the heart
- (17) *xin-zhong bei-shang*
 heart-in sad
 sorrow in the heart

This general metaphor of the heart (container for emotion), however, is two-fold. First, it consists of a coherent conceptual organization of emotion that originates from the heart, i.e. emotion is A SUBSTANCE IN THE HEART. Secondly, it is composed of a variety of conventionalized expressions that characterize the negative effect of emotion on the heart, i.e. emotion is A DAMAGING FORCE IN THE HEART. I will start with the concept of emotion as a substance in the heart container.

4.1. EMOTION IS A SUBSTANCE IN THE HEART. Of all emotional feelings, anger seems to be the most studied topic of emotion from a cognitive-semantic perspective. There are a number of metaphorical sources (Lakoff 1987) that characterize anger in English metaphors, the major domain of which is ‘anger is a hot fluid in a container’. The major corresponding source domain in Chinese metaphors for anger is, however, bound up with *qi*, which is literally gas. More often than not, the word for anger in daily uses is *nu-qi*, or simply *qi*. *Qi* is also regarded as energy that flows through the body (Yu 2002). For example, when *qi* rises from the heart, anger follows (18), and when it calms down, anger subsides and the harmony is restored in the body (19).

- (18) *nu-qi yong shang xin-tou*
 anger-gas rise up heart
 Anger rises from the heart
- (19) *xin-ping-qi-he*
 heart-level-gas-harmonious
 (indicating one’s calmness when faced with confrontation)

When anger becomes more intense, the gas rises; anger sets a fire in the heart. Very often, more intense anger is characterized as fire simmering, smoldering (20), and burning (21) in the heart rather than released. Similarly the smoldering anger/rage is sometimes compared to a volcano, but a dormant one (22). In the examples (20) to (22), the intensity of anger is depicted as high and on the rise, yet it is still kept closed in the container—the heart.

- (20) *xin-li bie-zhe huo*
heart-in hold fire
anger smoldering in one's heart
- (21) *nu-huo man qiang*
anger-fire full chest
burning with rage in the chest
- (22) *ta xin-tou yu-ji-de fen-nu xiang chen-mo-de huo-shan*
he heart gather anger like silent volcano
The rage in his heart was like a dormant volcano.

Not only is anger *qi*, it is also regarded as a fluid in the heart. While the fluid can be hot or seething, it can be cold and icy in the Chinese conceptualization. For example:

- (23) *fen-nu-de chao-shui zai ta xin-zhong fan-gun*
anger tidal-wave at his heart-in seeth
The tide of anger was seething in his heart.
- (24) *yi-ci you yi-ci ta qi-de han-le xin*
once again once he anger cold heart
Again and again, the anger finally froze his heart.

In (23) anger is rising as a seething tidal wave, whereas in (24), it falls (in temperature) and chills/freezes the heart. Of interest here is the conceptualization of anger in terms of a cold fluid or even ice in a container (the heart), which seems to be absent in the English metaphor of anger, i.e. ANGER IS HEAT. The cold concept of anger may have to do with the idea of control (i.e. ability to keep anger inside), or lack of control (i.e. release/display of anger). Anger, as a fluid, can rise, become hot, swell, overflow, or explode; it can also drop, become cold, and freeze. When the fluid is heated past a certain limit (intense anger), pressure increases in the container (the heart). One can either release the pressure by losing control, i.e. the container explodes, or one can control the release of the heated fluid for either destructive or constructive purposes with the effect of lowering the heat and pressure level. When taken to the lower extreme (i.e. the end point zero), the fluid freezes in the heart, and the self becomes numb, completely passive and unable to show or display anger. In other words, the self passively puts anger under control. As shown by the above examples, whether one controls anger or is overpowered by anger, the emotion is mostly kept contained in the heart.

While anger as a fluid can rise, fall and freeze, sorrow, including melancholy, seems always to be associated with the concept of a cold fluid in Chinese metaphors. Of all basic human emotions, sorrow seems to have the most negative effect on the heart and almost all sorrow metaphors make use of a cold, icy or broken heart. The following examples and idioms illustrate the concept of 'sorrow is cold/ice':

- (25) *ta-de xin bian-cheng-le yi-kuai bing*
 her heart become a-block ice
 Her heart became a block of ice.
- (26) *ta rang ta han-le xin*
 he make her cold heart
 He made her heart frigid.
- (27) *ta-de xin bei bei-shang bing-feng le*
 her heart PASS. sorrow freeze
 Her heart was frozen in sorrow.

These three examples are metonymical and metaphorical expressions, indicating that 'she' is deeply sad or sorrowful that 'her heart' changes 'quality' and freezes. Similar to the cold fluid metaphor for anger, the metonymy for sorrow is motivated by the 'drop in body temperature' physiological response, i.e. sorrow is often experienced as something cold and correlates with low skin temperature. When expressed in the figurative language of Chinese, it is the heart that is cold and freezes, and hence the self becomes devoid of the emotion.

It is interesting to see the difference in the conceptualization of anger and sorrow in Chinese. Though anger can occasionally be a cold fluid, it is frequently viewed as a hot gas or fluid, which can rise, be vented or explode. However, sorrow is viewed only as a cold fluid in nature and can only drop to even lower temperature: one can hardly vent one's sorrow, nor can one explode with sorrow. Hence the notion of gaining control or losing control over emotion is conceptually less available for sorrow, since sorrow can only be kept in the heart, freeze the heart and damage the heart.

Moreover, metaphors for fear also frequently employ the concept of the heart as a container and physiological sensations evoked by the emotion such as 'heart quivering', 'heart trembling', 'heart leaping', etc., as illustrated by the following examples:

- (28) *xin-jin-rou-tiao*
 heart-quivering-flesh-shaking
 (indicating extreme fright)
- (29) *ta xia-de xin yao cong zui-li beng chu-lai*
 he fear heart want from mouth jump out
 He was so frightened that his heart was about to leap out of his mouth
- (30) *mei-ci fu-qing zhao-jian ta, ta zong-shi xin-li yi-chen*
 every-time father want-see him he always heart sink
 Every time his father wanted to see him, his heart sank (for fear).

Like metaphors and metonymies for other emotional feelings, the conventionalized expressions for fear again illustrate the ubiquitous link between heart and emotion. However, fear/fright metaphors seem to emphasize more a change of the look, position, or quality of the container (see also Yu 2002) rather than the contained. When one is afraid or frightened, one's heart would quiver and tremble (28), leap out of one's mouth (29) or sink (30). In other words, the heart container is no longer in its normal state or position when affected by fear or terror.

The discussion of fear brings us to the other, perhaps more important aspect of the heart container metaphor that is characterized by the destructive and damaging force of emotion. When emotion gets intense, it would displace, hurt, even destroy the container because, on the one hand, emotion is in general believed to cause disturbance, agitation, destruction in oneself, as cautioned by traditional Chinese medicine, and on the other hand, emotion blurs one's vision and confuses one's heart, as frowned upon by traditional ideology. Hence both literally and figuratively, as well as physiologically and psychologically, emotion is a damaging force to the heart.

4.2. EMOTION IS A DAMAGING FORCE TO THE HEART. The concept of the damaging force of emotion is very productive in Chinese figurative language. Since emotions are closely associated with physical feelings or sensations (i.e. visceral disturbances, frequent flushing, intense irritability, etc.), we suffer from our emotions. In English, we are 'blind with rage', 'consumed by hatred', and 'devoured by conceit', etc. While these metaphors depict the suffering self, the Chinese metaphors emphasize the negative effect of emotion on the heart from anger and fear to sorrow and love, because all emotions originate from the heart. Examples (31)–(33) illustrate the damaging force metaphor.

- (31) *qi-de xin yao bao-zha*
 anger heart want explode
 so angry that one's heart explodes
- (32) *qi-de xin beng-beng luan tiao*
 anger heart (onomatopoeic) disorder jump
 Anger disturbs one's heartbeat.
- (33) *qi-de xin-ru-luan-ma*
 anger heart-as-confusion
 Anger bewilders one's heart.

Further, the 'damaging force done to the heart' metaphor is more explicitly embodied in the following metonymical expressions for sorrow:

- (34) *xin ru dao ge/jiao*
 heart like knife cut/twist
 (one feels) as if the heart is being cut/twisted by a knife

- (35) *hao-si wan jian chuan xin*
 like thousands arrows pierce heart
 (one feels) as if the heart is being pierced by thousands of arrows
- (36) *xin xiang bei si-lie-le yi-ban*
 heart same by torn as
 (one feels) as if one's heart is torn into pieces

Similarly, fear and shock are physical/psychological forces that may damage the viscera, especially the heart and the gall bladder. The concept of gall bladder is specifically associated with fear and shock, which may be based on the folk understanding of the human anatomy and the bodily functions, i.e. courage comes from the gall bladder as well as the heart. For example, *dan-xiao gui* 'a coward' literally means a person with a small gall bladder, and *dan-zi da*, a metonymy for 'fearless', is literally 'a big gall bladder.' Hence quite a number of metaphorical and metonymical idioms expressing the concept of fear emphasize the correspondence between intense fear/shock and the gall bladder and the heart, as shown in the following examples:

- (37) *xin jin dan chan*
 heart fear gallbladder shake
 the heart trembling and the gallbladder shaking (indicating intense fear)
- (38) *xia po-le dan*
 scare break gallbladder
 fear breaks one's gallbladder (indicating terror)
- (39) *xin dan ju lie*
 heart gallbladder all break
 one's heart and gallbladder are both broken (indicating intense terror)

The various kinds of physiological effects clearly indicate different intensity levels of fear from a leaping heart to the breaking of both the heart and the gallbladder. The damaging force of emotion does not spare love, especially romantic love, which can also be destructive to the heart and other internal organs. For example,

- (40) *chang xiang-xi, cui chang gan*
 long love-sickness destroy intestines liver
 Ever-lasting lovesickness destroys one's intestines and liver.
- (41) *li-bie shi ta xin-sui*
 separation make her heart-break
 The separation broke her heart.
- (42) *ta ai ta ai-de wu-zang ju sui*
 she love him result viscera all break
 She loved him so much that her viscera split.

The above metaphorical expressions reveal a great deal about our experience of romantic love and what love can do to us psychologically and physiologically when the emotion is too intense. Not only are emotions such as anger, fear, anxiety, sorrow, and love depicted as damaging forces to the heart in the Chinese figurative language, joy, a positive emotional feeling, cannot be indulged without constraint, since extreme joy may also cause tragedy. The following expressions imply the negative aspect of intense joy or happiness, rendering a derogatory sense of the emotion.

- (43) *le ji sheng bei*
 joy extreme bring sorrow
 Intense joy begets sorrow
- (44) *ta le feng-le*
 he joy mad
 He is crazy with joy

The above discussion demonstrates that the heart metaphor conceptualizes almost all human emotional feelings. Chinese abounds in emotion idioms and expressions that employ the concept of heart. This has its roots in traditional Chinese medicine and ideology and the folk theory of the physiological effects of emotion.

7. CONCLUSION. The present paper investigates the role of the heart in the conceptualization of emotion in Chinese figurative language and shows that there is a coherent conceptual organization underlying the metaphorical and metonymical expressions for emotion. It argues, in general, that there are two central ideas in the conceptualization of emotion in Chinese, both characterizing the HEART AS A CONTAINER: one is A SUBSTANCE IN THE HEART and the other A DAMAGING FORCE TO THE HEART, as revealed by a variety of metaphorical entailments of and lexical elaborations on such source domains as gas/fluid, knife, fire, ice, natural force, physical/ psychological agitation, etc. These general metaphors for emotion and their structural organization are largely based on the Chinese folk understanding of the physiological effects of emotion on the body and bodily functions, and influenced by the ancient Chinese philosophy of human nature and feelings. It seems that the cultural models of emotion are indeed the joint products of metaphor and metonymy, physiology, and the cultural context (Kövecses 2000). The study of emotion metaphors and metonymies enables us to see how people of a given culture or different cultures conceptualize and verbalize their emotion, given that the nature of the human body and its physiology are presumably universal.

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CAN RELATIONAL NETWORK THEORY EXPLAIN REACTION-TIME DATA?

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A SUBSTANTIAL NUMBER of psycholinguists are exploring the structure of language by studying reaction times in an experimental paradigm known as the **lexical decision task**. They have identified some conditions that result in facilitation, which decreases the reaction time, and other conditions which result in inhibition, which increases the reaction time. These findings have substantial significance for linguistic theory. Unfortunately, there is a lack of communication between experimental psycholinguistics and linguistics. Part of the reason is that mainstream linguistics, i.e. the generative approach, has become so divorced from psycholinguistic data that their theories are seen to be irrelevant and arcane to the psycholinguists. Conversely linguists do not make enough of an effort to relate to their psychology counterparts. We consider this unfortunate because we feel we can learn from one another, as we hope to demonstrate.

We will look at a particular type of experimentation that is occupying the attention of a number of psycholinguists and relate their results to Relational Network theory, as first developed in the 1960s, especially by Sydney Lamb (1966, 1999) and his students (e.g. Christie 1976, Lockwood 1980), and as refined by Reich (e.g. 1960), Dell (Dell & Reich 1981), and Richards (2004). It will turn out that in a relatively minor way the theory must be modified to account for the results we obtained. In particular, the issue of simplicity in a relational network will be revisited.

The experimental task is what is known as a **lexical decision task**. Subjects press a button with their right index finger when visually presented with a string of letters if that string of letters is a word. They press another button with their left index finger if that string was not a word. Half of the test items are words and half are non-words. The variable measured is the speed—the reaction time—of the response to real words.

A subset of these experiments is the **cross-modal priming task**. The subject first hears a sound, usually a word. This is the **prime**. Then a string of letters appears on the computer screen. This is the **target**. We will discuss seven conditions. Examples of each are given in **Table 1** (overleaf).

There are two baseline conditions. The first is when the prime is a word-length burst of white noise. The second is when the prime is identical to the target. The next two is when the items look similar. Condition three is a case of similar but not related. Condition four is a case of similar and related. The next cases are where the two forms are orthographically dissimilar. Condition five is a case of not similar and not related. Condition six is a case of not similar but related. The seventh condition is when the

	Unrelated Prime	Related Prime
Base Line	1. [noise]~give	2. give~give
Orthographically Similar	3. slam~slim	4. gave~give
Orthographically Dissimilar	5. look~give	6. taught~teach
Morphologically Regular		7. walked~walk

Table 1. Seven experimental conditions.

	Unrelated Prime	
Orthographically Similar	slam~slim	710 ms
Orthographically Dissimilar	plot~slim	657 ms

Table 2. Experiment 1: Inhibition due to orthographic similarity.

prime is a regularly inflected version of the target. Using this paradigm, psycholinguists have come up with some linguistically interesting results.

Marslen-Wilson et al. (1993) found that there was **facilitation**—that is, the reaction time was faster—in the following two situations:

1. when the prime and the target are identical—for example, when the prime and target are both the same word: (*give~give* or *walk~walk*).
2. when the prime is the uninflected form and the target is a regularly inflected form: (*walk~walked*).

In another study (Marslen-Wilson et al. 1994) they found that *sane* facilitated *sanity*, that *decide* facilitated *decision*, and that *govern* facilitated *government*. In other words, there was facilitation in the case of regular, predictable **derivational** morphology as well as **inflectional** morphology.

However, they found **no** facilitation when the prime was the base form and the target was an irregular form, as in the case of *give* and *given*. Similarly, they found **no** facilitation between *apart* and *apartment*, where there was phonological similarity but no obvious semantic connection. These results have been replicated in two other studies (Marslen-Wilson et al. 1995; Allen & Badecker 1997).

In order to explain these results Allen and Badecker (2002) proposed that the reason that there was no facilitation in the above cases is that the situation led to a combination of facilitation and **inhibition**, which cancelled each other out. They tested this hypothesis by comparing the reaction times of *gave~give*, which are orthographically similar, with *taught~teach* which are orthographically different. They predicted facilitation in the case of *taught~teach*, while the facilitation that should result in *gave~give* was cancelled by the inhibition due to orthographic similarity. Their results are shown in **Tables 2** through **4**.

Note in **Table 2** that it takes longer to determine that *slim* is a word when it is primed with a similar word, like *slam*, than when it is primed with a different word, like *plot*.

Related Prime		Unrelated Prime	
<i>taught~teach</i>	469 ms	[noise]~ <i>teach</i>	511 ms
		<i>look~teach</i>	514 ms

Table 3. Experiment 2a: Facilitation of an orthographically dissimilar but related prime.

Related Prime		Unrelated Prime	
<i>gave~give</i>	508 ms	[noise]~ <i>give</i>	513 ms
		<i>look~give</i>	514 ms

Table 4. Experiment 2b: Orthographically similar related prime; inhibition & facilitation cancel each other.

The part of their second experiment in **Table 3** shows two things: first, there is no difference in the reaction time to *teach* between when the prime is a totally unrelated *look* than when the prime consists of a burst of white noise. Second, there is a significant reduction in the reaction time when the prime is the semantically related but orthographically dissimilar *taught*.

The part of their second experiment in **Table 4** shows two things: first, there is no difference in the reaction time to *give* between when the prime is a totally unrelated *look* than when the prime consists of a burst of white noise. Second, there is **not** a significant reduction in the reaction time when the prime is the semantically related **and** orthographically similar *gave*.

Similar but unrelated words lead to inhibition; dissimilar but related words lead to facilitation. But similar related words seem about equal to dissimilar unrelated words.

We have constructed a new simulation of the Relational Network model. This model is an improvement over the Dell and Reich (1980) model in several ways. In this simulation, nodes do not fire until a threshold of activation is reached. This model thus takes time to analyze linguistic input. The time it takes can be compared with psycholinguistic results on reaction time tests. This model, unlike the earlier version, can be used to test language comprehension as well as language production.

This model has other advantages as well. The earlier model postulated three types of signals in the network: activation, anticipation, and negative feedback. The revised model reduces this to a single signal that ranges from +1 to -1. This seems more in line with our understanding of the neurological facts and in line with some proposals by Lamb (1999) and Christie (1976). This model is described in more detail in Richards (2004).

We tested our spreading activation model on these examples, using two grammars to describe the linguistic information. Grammar A shows the maximally simple representation of the *give~gave* alternation, representing the fact that only the vowel differs. It also captures the common final *k* in *look* and *walk*. Grammar B treats *give* and *gave* as completely different forms; that is, it doesn't take into account the fact that the initial and final consonants of the two forms are identical. Allen and Badaecker ran

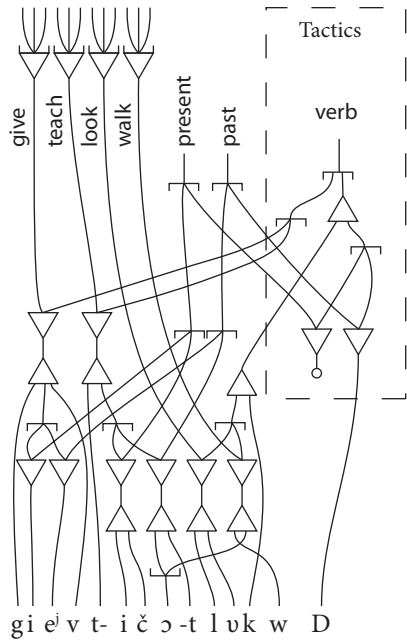


Figure 1. Grammar A.

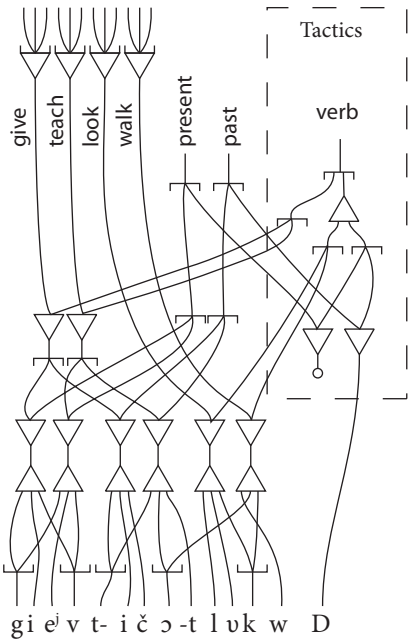


Figure 2. Grammar B.

20 subjects; we ran our simulation 20 times. Our model includes some randomness in the strengths of the signals, so each run will give different values. The results are shown in the tables and graphs below, first for Grammar B and second for Grammar A. Grammar B gives results that correspond to how subjects perform. It shows inhibition in the case of orthographically similar primes, facilitation in the case of semantically related and orthographically dissimilar primes, and no significant effect in the case of similar and related primes.

Our results are shown in the charts below. Statistical tests for significance (the *t*-test) were performed on all the results.

Figure 3 shows the mean reaction time for the regular verb *walk* when primed with white noise, when primed with *look*, and when primed with *walked*. A statistical test showed no difference between priming with white noise and priming with *look*. However, the test showed a significant facilitation when the prime was the past tense form *walked*.

Figure 4 shows the mean response time to *give* in four differing priming conditions. The time is not significantly different when primed with white noise and *look*. There is significant facilitation when primed with itself (*give*). There is no significant effect when primed with its past tense form *gave*.

Figure 5 shows the mean response time to *teach* in four different priming conditions. Again, the time is not significantly different when primed with white noise

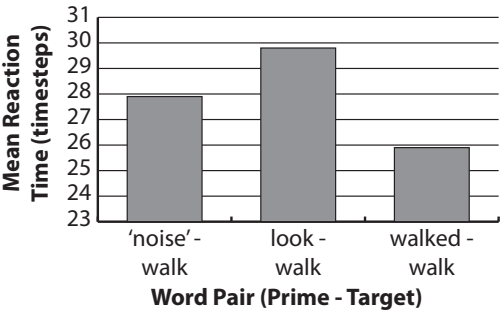


Figure 3. Priming for the regular verb walk in an unsimplified network.

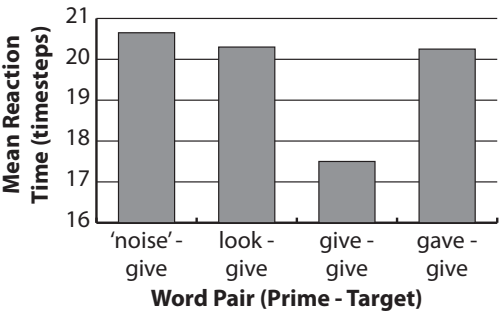


Figure 4. Priming and inhibition for the irregular verb give in an unsimplified network.

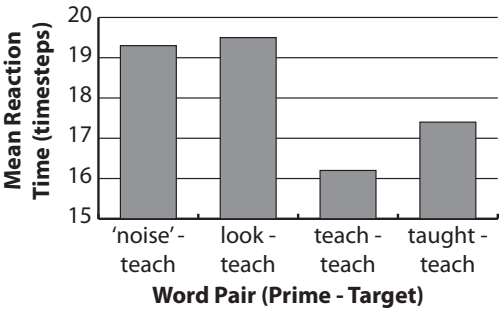


Figure 5. Priming for the irregular verb teach in an unsimplified network.

and with *look*. There is significant facilitation when primed with itself, and also when primed with its past tense form *taught*, in this case significantly different from its present tense form.

We performed the same analysis on Grammar A, the maximally simplified grammar. In this case the results did not correspond to the experimental results found by Allen and Badecker. Specifically, as can be seen in **Figure 6** (overleaf), *taught* did not prime *teach*, as it did in the experiments and in the simulation of Grammar B.

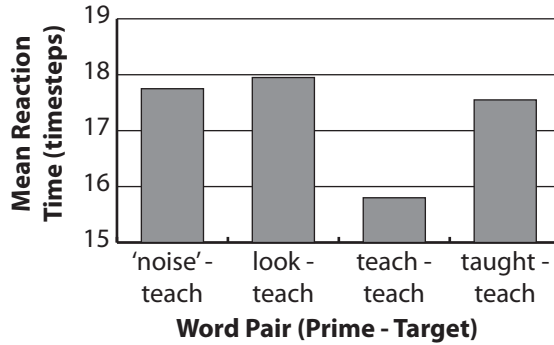


Figure 6. Priming and inhibition for the irregular verb *teach* in a simplified network.

What can we linguists learn from these experiments? In terms of the structure that we propose, this simulation demonstrates that our model can explain these reaction time priming experiments. However, it suggests that native speakers do not necessarily come up with the simplest possible grammar with respect to the internal morphological structure. The concept of maximal simplicity evolved when computer memories were expensive. The human brain appears to not need to squeeze every bit of similarity out of related words to save neurons.

Is there other justification for the notion of less than ‘maximal’ simplicity? We believe there is. One can argue that it would account for a phenomenon we have called ‘preferred order combinations.’ Many common phrases consist of two words connected by *and*. Although semantically there is no reason to prefer that one of the words precedes the other, in fact, one word ordering is preferred to the other. The degree of preference can be measured by search counts on occurrences on the Web given by Google™. We consider a combination to have a preferred order if one order occurs more than twice as often as the other. Often the difference in the two frequencies is much greater than that. **Table 5** gives a few examples.

One can account for this by postulating that any sequence at any level that occurs frequently will be stored as a unit, even if it is not lexicalized in the sense of having a distinct meaning the way an idiom like *black and blue* has. Assuming that this occurs at any level, we would expect that the sequence of phonemes that generates *gave* will be stored as a unit rather than as an initial *g*, a final *v*, and a vowel between the two that varies depending upon tense.

In our grammars above, we have outlined with a dashed line the portion of the language system that is used to generate new sentences, labeled the Tactics. The part of the network not within the box would be considered the Realization portion, or the lexicon, broadly defined. There is neurological evidence to suggest that the construction of regular verbs resides in the Tactics, while the construction of irregular verbs resides in the Realization portion of the grammar. Miozzo (2003) reported on AW, a patient with brain damage who lost the ability to produce irregular verb tenses and

ladies and gentlemen	607,000
gentlemen and ladies	12,500
husband and wife	534,000
wife and husband	14,400
ham and cheese	46,500
cheese and ham	6,410
rich and poor	323,000
poor and rich	16,000
rain and snow	86,600
snow and rain	24,000

Table 5. Some preferred order combinations together with their Google frequencies on July 18, 2003.

noun plurals, but retained the ability to produce regular verb tenses and noun plurals, even for nonce items. Other patients have been found to be better at irregular verbs and nouns than for regular forms (Ullman et al. 1997).

These differences have been found to correlate with neurological damage to different parts of the brain. Evidence from these studies as well as the cross modal priming studies suggest that irregular inflections are stored and processed differently in people’s minds.

Psycholinguists have developed a number of models to explain their results. These include the Distributed Cohort model proposed by Marslen-Wilson et al. (1996) and the TRACE model proposed by McClelland and Elman (1986). As these models evolve, they, too, can be made to accommodate the lexical decision findings. The TRACE model even has levels that correspond to our strata. However, none of these models can account for linguistic data generally, nor can they account for other phenomena that our model can account for, such as slips of the tongue or unintended puns. In conclusion, we are suggesting two things. First, our current spreading activation model of Relational Network grammar can account for the results of different priming conditions on lexical decision tasks. And, second, that reaction time priming studies can be used to decide among different possible hypothesized grammars. A closer collaboration between cognitive linguists and psycholinguists could lead to not just a neurologically plausible model of a broad range of language behaviours, but to grammars that are experimentally testable.

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TESTING RELATIONAL NETWORK GRAMMARS

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DELL AND REICH (1980) DESCRIBED a relational network system developed for the production of word pairs. Their goal was to show that a spreading activation adaptation of relational networks as conceived by Lamb (1966) would produce mistakes similar to those made by human subjects in psycholinguistic experiments.

This paper will outline a relational network simulation called R.A.I.N. (Relational Activation and Inhibition Network). It is based on Dell and Reich's network with some changes to make it even more similar to biological neural systems and more in line with other connectionist models. This system has been implemented in Java and is available on the Internet at <http://individual.utoronto.ca/rns/RAIN.html> for testing. The system allows researchers to experiment with new or modified grammars.

Three modifications to the Dell and Reich model involve: (1) a different understanding of the nature of a neural threshold, (2) a better handling of inhibition, and (3) a modification of the notion of competition that involves time as a factor, which allows us to understand reaction time experiments.

This new system should preserve all of the behaviours of the earlier version as well as exhibiting new behaviours similar to other psycholinguistic data, such as reaction time data. This bridges two gaps: (1) the gap between Lamb's model and connectionist models (2) the gap between Lamb's model and psycholinguistic models such as those considered by Allen and Badecker (2002).

The goal of implementing this model and placing it on the web is that it will allow linguists to test grammars that they might propose using a system that exhibits performance characteristics known to be similar to human beings. This provides a needed tool for those interested in relational network neurolinguistic models.

THE MOST SUBSTANTIAL EVIDENCE that any model of the neurocognitive basis of mental phenomenon can receive is direct evidence from micro-studies of living neural systems, such as single-cell recording studies. These micro-studies are not an option for linguists, since humans are the only animals with the faculty under consideration. We may make inferences from the workings of systems in other animals, but this is at best indirect evidence (Lamb 2003:13). Authors who propose that the initial state of the linguistic system is very peculiar biologically (Chomsky & Lasnik 1993:14) would argue that this evidence is not tenable. This would be true if linguistic competence in the human brain doesn't work in the same way as something like visual recognition in the macaque brain. Therefore, we have been told that neurocognitive models of language are '...beyond serious inquiry for the time being' (ibid. 18) One can

question the grounds for such a stance, but it is nonetheless a real impediment to the gathering of evidence for neurocognitive models of language.

There is an option available to those interested in the microstructure of cognition: the option of simulation. Researchers that advocate a particular neurocognitive model can simulate their model. If the simulation is a) neurologically realistic and b) displays behaviours similar to those of humans it can be argued that the simulation provides evidence for that model. Parallel distributed processing models have benefited from simulation evidence since the 1980s (e.g. Rumelhart & McClelland 1986 *passim*). Neurocognitive relational network models are no exception (Dell & Reich 1980 *passim*). It is important for relational network theorists to continue to use evidence from simulation in their work. To this end, I have developed a flexible simulator for relational networks called *Relational Activation and Inhibition Network* (RAIN). RAIN is based substantially on the relational network of Dell and Reich (1980). RAIN involves several departures from the older simulation to meet a variety of goals. This paper will outline these departures and goals, describe RAIN briefly, and give a graphic representation of a RAIN production to aid understanding of the model.

1. THE SLIPS OF THE TONGUE MODEL. In 1980 Gary S. Dell and Peter A. Reich produced a relational network model of speech production. Their model was intended to account for slips of the tongue. Slips of the tongue have been an important source of psycholinguistic data and this provided Dell and Reich with a large base of facts that their model was to account for.

Dell and Reich recognized the importance of simulating their model for the purpose of presenting confirmation that relational networks could indeed account for slips of the tongue. The simulation was a spreading activation relational network; this provided the possibility of errors and made the simulation more neurologically realistic than the discrete signal systems used in other relational network models (Lamb 1966 *passim*; Reich 1970 *passim*). The simulation provided very exciting results. It made ‘...very humanlike errors...’ displaying many of the error patterns found in human production (Dell & Reich 1980:8).

However, the model was not comprehensive enough to account for reaction time data. It also did not take into account a number of findings from neuroscience. RAIN borrows heavily from the Dell and Reich model but includes several innovations.

2. OBJECTIVES AND CONSIDERATIONS FOR RAIN. The Dell and Reich model was an achievement in relational network theory. Nonetheless, several additional objectives and considerations have resulted in the changes and adaptations I have made to the old model, and provide grounds for seeing the changes as an improvement.

An empirical basis for the science of linguistics can be sought from a variety of phenomena. Lamb (1999) defines four bases of linguistic reality: speech production, utterances and text, psychological data, and neurocognitive data¹. Researchers and theorists argue for a need to draw more attention to the neurocognitive and psychological data (*ibid.* 10). Hence, the goals and considerations that influenced the

construction of RAIN can be grouped into three categories: neurocognitive, psychological, and general. For the purpose of grounding the new simulation I shall describe some of these issues.

2.1. NEUROCOGNITIVE CONSIDERATIONS. The nodes in a relational network are intended to represent groups of neurons (Lamb 1999 *passim*). The activation of a node is representative of the activity of that group of neurons. Also, each node in a relational network has connections to other nodes. Activation of one node spreads to other nodes via these connections. This models the neurological fact that groups of neurons can influence the activity of others.

There are two features of neurons that did not play a role in the Dell and Reich model. First, neurons transmit signals across synaptic gaps with neurotransmitter chemicals that cause either an increase in the postsynaptic voltage potential (excitatory postsynaptic potentials or EPSPs) or a decrease in the postsynaptic voltage potential (inhibitory postsynaptic potentials or IPSPs) (Rosenzweig, Breedlove & Leiman 2002:69–72). EPSPs were included in the Dell and Reich model but IPSPs were not. Nodes could only increase a neighbour's activity, not decrease it. IPSPs could have provided an additional element for modelling human linguistic behaviour. This feature has been taken into consideration in the new simulation by the inclusion of negative signal values.

Second, in the old model, when a node's activation fell below threshold the activation dropped to zero. However, a neuron that is not yet at the action potential threshold is still receiving signals and exhibiting EPSPs and IPSPs (*ibid.*). A neuron could have different rates of EPSP and IPSP responses. Thus, another type of activation can be included in the model that would represent the activity of the neurons in the node when they are below threshold; this would be a combination of the rate of responses and the amplitudes of those responses. RAIN provides an activation value to represent this activity². At the same time, to preserve the purpose of threshold from the old simulation, RAIN prevents a node from spreading its activation to neighbouring nodes if the activation is below threshold.

2.2. PSYCHOLOGICAL CONSIDERATIONS. A common measurement used in psychology studies is reaction time—the time it takes a subject to respond to something. This tool has proven useful in psycholinguistic studies (see Allen & Badecker 2002 and the references cited therein), and has been included in many psychological models (e.g. Anderson, 1983 *passim*). Thus, the new simulation can produce, as did the Dell and Reich (1980) simulation, but it can also comprehend. As well, it outputs a measurement of how long it takes a network to receive feedback, which indicates that a process has finished. This provides linguists working within the relational network framework the ability to incorporate reaction time predictions in their models and compare the simulation data with human data. Different grammars result in different reaction time data from the simulation. Thus, grammars can be scrutinized based on the reaction time data they provide. For example, Reich and Richards (2004) analyzed

simulated reaction time data for two different network grammars of a portion of an English speaker's lexicon. They compared this data to the reaction time data from psycholinguistic experiments by Allen and Badecker (2002). Reich and Richards (2004) suggested that the network grammar that showed the greatest similarity to the psycholinguistic data was a better representation of English speakers' lexicons.

2.3. GENERAL CONSIDERATIONS. From a more general perspective there was one goal with two components: one theory driven, the other more utilitarian. The first is to extirpate the perceived dichotomy between symbol manipulation systems and connectionist systems. Pinker and Prince (1988) discussed the variety of possible relationships between connectionism and symbol manipulation. Connectionist models could be a) implementational—merely implementing symbolic systems, b) eliminative—replacing symbolic systems, or c) revisionist-symbol processing—implementing symbolic systems in a manner that informs the symbolic models. This third category represents a true combination of symbol processing and connectionism. Many connectionist systems fall in the first category (Touretzky & Hinton 1985 *passim*) and the second category (Rumelhart & McClelland 1986 *passim*). As Marcus (2001) suggests, I believe that any distinction between symbol-manipulation and connectionism is an artefact of one's definitions of such things as symbols, and it is harming a more integrated approach to several areas of study such as language. With this consideration in mind my goal was to make RAIN fall squarely in the third category—revisionist-symbol processing. It does not eliminate the symbol-network distinction, but it does not segregate the two methods of description either, rather it integrates them.

RAIN provides an interface with which a user can type in symbolic formulas to represent network structure. Symbolic formulas and their relational network counterparts are two models of the same theory (Lamb 1966:8–12). Both formulas and networks can inform each other: the formulas lay out the architecture of the networks, and the networks provide another platform for judging the correctness of the formulas. RAIN fulfills this description: it can process the symbolic formulas to produce a network—the SAME network logic that the symbols represent algebraically. A user can theorize symbolically while allowing a connectionist implementation to inform those theories.

Thus, the second component is to provide linguists with a highly malleable tool for testing their grammars. To ensure that one's grammar does indeed produce or comprehend what is asserted, the grammar can be input into RAIN and run with a variety of inputs to see the results. As well, for those interested in 'narrow' definitions of nodes, RAIN provides a means for any user to define the behaviour of the nodes. Combined with the reaction time tool described above, RAIN can be seen to be a very flexible and versatile simulation for linguists working with relational network grammars to utilize. RAIN is available on the web as a Java applet at <http://individual.utoronto.ca/rns/RAIN.html>.

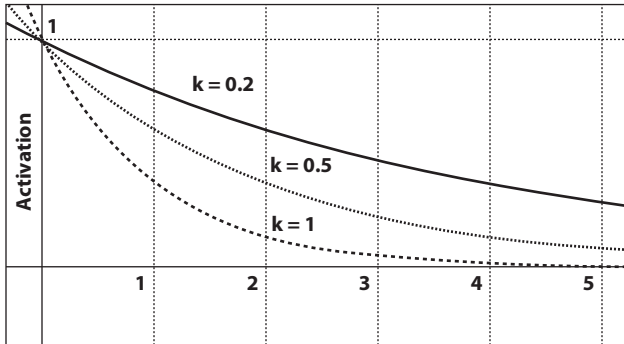


Figure 1. Three different decay curves.

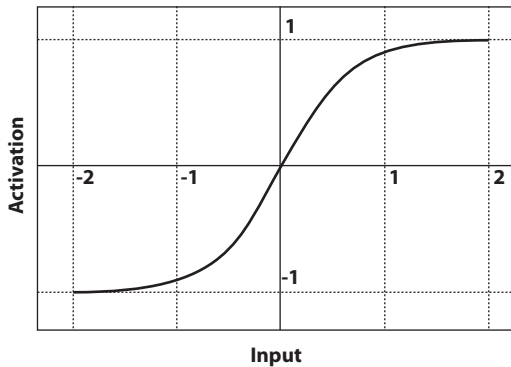


Figure 2. Sigmoid summation.

3. RAIN. With the founding considerations flushed out, I will now briefly present the principles of RAIN:

1. **Activation.** Each node has a number associated with it ranging from minus one to plus one.
2. **Decay.** At each time step a node's activity will tend towards zero by means of an exponential decay multiplier. The result of this is that the decay associated with high activation will be greater than the decay associated with low activation. The user sets the decay constant, k , for the decay factor e^{-k} , the greater the value for k the greater the rate of decay, as shown in **Figure 1**.
3. **Noise.** Each time step a node's activation will increase or decrease by a random amount multiplied by a noise constant set by the user.
4. **Spreading.** During each time step, if a node is above threshold a fraction of its activation will spread to neighbouring nodes. The weights determining the spread of the activation are determined by the state definitions defined by the user.
5. **Summation.** A node's activation is the y-value of a sigmoid function given the sum of all the input activations and the current activation, as shown in **Figure 2**.

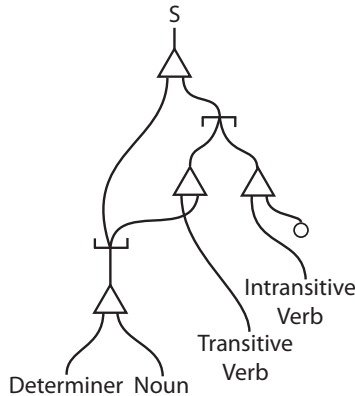


Figure 3. Simple network used in example.

6. **Threshold.** A node will only spread activation if it is above a threshold activation set by the user.
 7. **Signalling.** When it is time for a construction to be generated a positive signal is sent down the input connection of the construction to be generated. Negative signals can be used to inhibit other constructions.
 8. **Satisfaction.** Certain states in a node's definition are defined as SAT states (SAT stands for satisfaction.) When a node enters a SAT state it remains in that state for only one time step before returning to the zero state.
 9. **Competition.** When there are two possible connections for a signal to go down, as in a disjunction node, signals are sent down both connections. The connecting node that reaches activation first sends a small signal back up to the disjunction to have it inhibit the other connection. Thus, the connected node with the highest activation will generally 'win' because it will reach threshold first.
 10. **Rate.** The rate of input signals can vary independently of the rate at which signals travel through the network.
 11. **Feedback.** When an input connection sends a signal to a node to generate a construction it continues to send that signal until it has received feedback to stop. The simulation only considers a construction complete if feedback has been received by all inputting connections. If feedback is received too early the simulation will stop regardless of whether the construction was truly complete.
4. AN EXAMPLE PRODUCTION. To provide a more intuitive understanding of how RAIN works I will describe, using graphs of the activation of the nodes, an example production by RAIN. (Recall that RAIN can both 'comprehend' and produce.) To make it as easy as possible I will utilize the simplistic, and psychologically unrealistic, network displayed in **Figure 3**. An understanding of how to use RAIN can be developed by reading the manual page on the website and playing around with the simulation.

Network Formula

S = (SubjectNP + VP)

(Subject NP | Object NP) = Determiner + Noun

VP = (TransitiveVP | IntransitiveVP)

Transitive VP = (TransitiveVerb + ObjectNP)

IntransitiveVP = (IntransitiveVerb + 0)

Construct Network

Deconstruct Network

Figure 4. A formula in the RAIN interface.

Input

~~~~~ S

Run Input

Step

Halt

**Figure 5.** Input in the RAIN interface.

**Output**

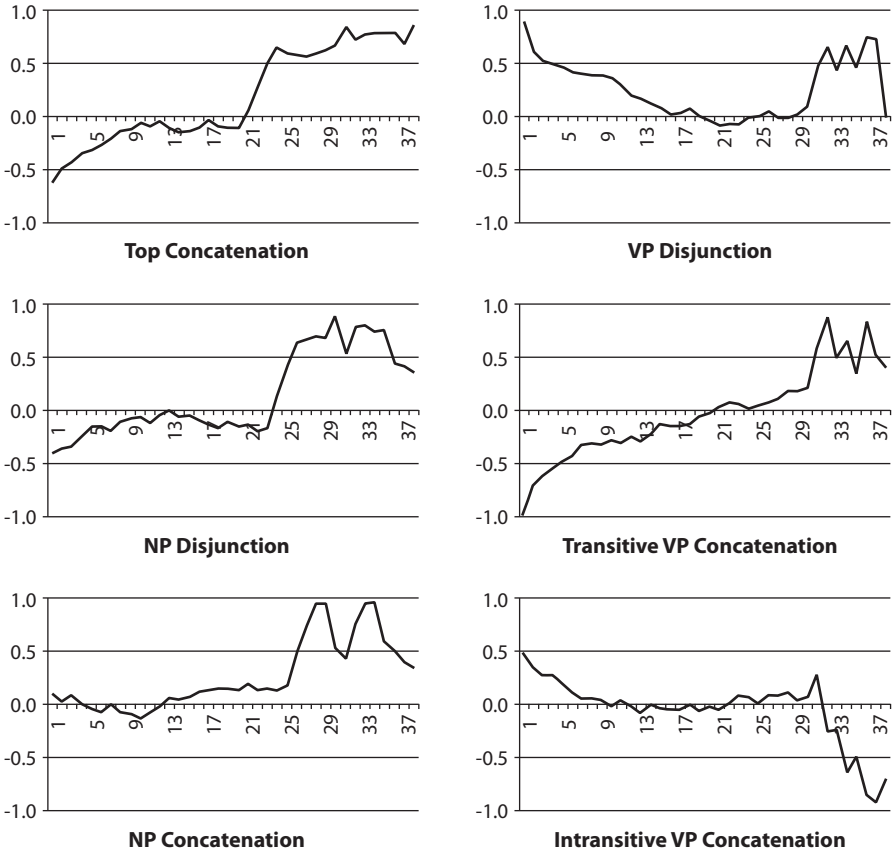
```
Determiner Noun TransitiveVerb Determiner Noun  
~ Finished in: 38 | time
```

**Figure 6.** Output from RAIN.

First, the user must input the correct formula for the network. There are many ways to implement this network in a formula; a straightforward approach is displayed in **Figure 4**. The form of the formulas and the meanings of the symbols are given on the manual page provided on the website.

Next, the user must give input for the network to process. If a symbol in the input corresponds to a wire name, then that wire will send positive signals until it receives feedback. The symbol ‘~’ is reserved by RAIN to correspond to a delay in input. So, in the example shown in **Figure 5** RAIN goes through twenty time steps, one corresponding to each ‘~’, before receiving the input ‘S’ to begin construction.

**Figure 6** shows the output results of the input in **Figure 5**.



**Figure 7.** *Graphs of the activations of each node in the network during production.*

Figure 7 shows the activation of the nodes during a production run over the 38 time steps it took the input wires to receive feedback. To get RAIN to print the activations of each of the nodes for each time step, users can switch the ‘black box’ option off. The decay constant was set to 0.5; the noise constant was set to 0.05; and the threshold was set to 0.5. There are several things to note:

- **Decay & Noise:** all of the nodes are given random activations by RAIN at the start of the run. During the delay time steps (time steps 1-20) the activations all head towards zero due to decay. However, it is not a smooth path, due to noise in the system.
- **Signalling:** when the ‘S’ signal is received (time step 21) the top concatenation’s activation begins to climb. Once it hits threshold (time step 24) the activation of the NP disjunction node begins to climb due to spreading.

- **Competition & Inhibition:** when the VP disjunction node hits threshold (time step 31) the two different VP constructions compete for the signal. The transitive construction hits threshold first (right away at time step 31), so it sends a signal to the disjunction, in turn the disjunction begins to inhibit the Intransitive VP construction which can be seen from the large dip in its activation (time step 32).
- **Activation as Construction:** We can see that the top concatenation is active during the entire construction. Also, there are two distinct spikes of activity for the NP node, corresponding to the two noun phrase productions in the construction.

5. **CONCLUSION.** There are still many modifications that need to be made to RAIN in the future. Most strikingly, because RAIN requires the user to input the grammar and define the nodes RAIN does not exhibit anything like learning. This is unfortunate because one of the advantages of other connectionist systems (e.g. Rumelhart & McClelland 1986 *passim*) is the departure from radical nativism. However, though learning in relational networks has been discussed (Lamb 1999; Reich 2002 *passim*) the necessary mathematical formalisms defining this learning are not yet in place to simulate it on a computer. This is a project for the future.

Another issue is that RAIN, despite being more neurologically accurate than Dell and Reich's (1980) simulation, is still far from neurological reality in several ways. For instance, neurons have different thresholds, and these thresholds can change over time (Lamb 2003:14). This is just one of the many neurological facts not utilized by RAIN. This is an additional project for the future, possibly one that will never end since neuroscience will provide new information.

Simulation can be an important tool for linguists involved in neurocognitive explanations of language. Without simulation linguists are at a severe disadvantage compared to researchers involved in neurocognitive accounts of perception or motor control. However, linguists are often not trained in computer programming, which is exactly why it is necessary to make simulation tools that are easy to use and available for general use. RAIN is not the end-all of relational network simulations, but one can argue that it is a step in the right direction.

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<sup>1</sup> These are my own names for them. They are a little simplistic; for a better description see Lamb (1999).

<sup>2</sup> A future goal of the project is to use numerical methods for representing activation that are more realistic. Currently, a single number is used to model below- and above-threshold activation. The activation represents rate of fire when it is above threshold, and EPSP/IPSP responses when it is below threshold. Clearly this is not optimally realistic, because the relationship between rate of fire and EPSP/IPSP responses is not this simplistic.

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## PSYCHOLINGUISTIC ASPECTS OF VERBO-NOMINAL POLYVALENCE IN MAYA ROOTS

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USING EVIDENCE PRIMARILY FROM THE MAYA LANGUAGE of the Yucatán peninsula in México, the present paper proposes and explores testable psycholinguistic implications of contrasting solutions to what seems at first to be merely a lexicographic puzzle and concludes that the polyvalence of lexical roots raises rather deeper and quite intriguing psycholinguistic questions.

Let's begin with a few facts about Maya (cf. Straight 1976a). Sometimes known as Yucatec (spelled Yukatek by some, mostly European linguists, e.g. Bohnemeyer 2002), Peninsular Maya, or *el maya-yucateco*, and very similar to Chan Santa Cruz Maya and Lacandón (or Lakantun) spoken in Quintana Roo and Chiapas, in 1990 Maya had nearly three quarters of a million speakers (*Ethnologue* 2004), more than at the time of first European contact and nearly 50 percent more than a generation or so ago (Robertson 1992), and that number has almost certainly grown considerably over the last decade plus. Virtually all Maya speakers reside in the Lowland Maya area, which includes inland Belize (near the Quintana Roo border), the states of Yucatán, Campeche, Quintana Roo, and Chiapas in México, plus portions of the Petén, the northernmost part of Guatemala. Although bilingualism in Spanish has increased apace over the past few generations, a higher proportion of the population of the state of Yucatán speaks an indigenous language (in this case Maya) than in any other state in México (Güemez Pineda 1994). The growth of the Maya-speaking population has occurred as a result of a high birth rate among its speakers but also because of a low rate of out-migration, a somewhat falling death rate, and the recent growth of Maya as a late-acquired second language by non-Mayan Yucatecans, who embrace Maya as an emblem of their sociopolitical unity and, perhaps more importantly, their separateness from the rest of México (cf. Güemez Pineda 1994).

I want to focus here on a few well-known properties of Maya roots. **Table 1** (over-leaf) provides examples of the canonical forms of Yucatec roots, all of which, whether categorized as verbs, nouns, adjectives, pronouns, or whatever, have the same Consonant-Vowel-Consonant shape. Any root not having this form can almost always be traced to a non-Mayan source, borrowed either from Spanish as a result of the post-Conquest contact, or, reflecting a previous era of semi-domination by the Aztecs, from Náhuatl.

Mayan linguists have long struggled with the question of how to categorize lexical roots that exhibit the morphosyntactic properties of both nouns and verbs (Laughlin 1975). That is, some roots participate in both nominal and verbal morphological

| Short V                       | Long low V                   | Long high V               | Laryngealized V          |
|-------------------------------|------------------------------|---------------------------|--------------------------|
| <i>kan</i> 'four', 'learning' | <i>kaan</i> 'snake'          |                           | <i>ka'an</i> 'sky'       |
| <i>koj</i> 'tooth', 'puma'    | ( <i>in kooj</i> 'my tooth') | <i>kóoj</i> 'arrive'      | <i>ko'oj</i> 'expensive' |
| <i>mis</i> 'muscle'           | <i>miis</i> 'cat'            | <i>míis</i> 'broom'       |                          |
|                               | <i>weech</i> 'armadillo'     |                           | <i>we'ech</i> 'mange'    |
|                               | <i>xuux</i> 'wasp'           | <i>xúux</i> 'tall basket' |                          |

**Table 1.** Examples of Maya roots (after Ximena Lois & Valentina Vapnarsky n.d.).

|          | Person            | Set A (nominative)      | Set B (absolutive) |
|----------|-------------------|-------------------------|--------------------|
| Singular | 1st ('I')         | <i>in(w)*-</i>          | <i>-en</i>         |
|          | 2nd ('thou')      | <i>a(w)*-</i>           | <i>-ech</i>        |
|          | 3rd ('he/she/it') | <i>u(y)*-</i>           | <i>-ih/-Ø**</i>    |
| Plural   | 1st, exclusive    | <i>k-/in-...-o'òñ</i>   | <i>-o'òñ</i>       |
|          | 1st, inclusive    | <i>k- ... -e'èx</i>     | <i>-o'òñ-e'èx</i>  |
|          | 2nd ('you-all')   | <i>a(w)*- ... -e'èx</i> | <i>-e'èx</i>       |
|          | 3rd ('they')      | <i>u(y)*-...-o'òb</i>   | <i>-o'òb</i>       |

**Table 2.** The two sets of person markers in Maya. \* Glides are used before vowels. \*\* Null when another suffix follows.

and phonological paradigms and appear to shift in their pragmatic and semantic import between nominal and verbal meanings, or, at any rate, between nominal and verbal morphosyntactic paradigms. In addition, many apparently roots classed as verbal sometimes describe actions, sometimes activities, and sometimes states, thus exhibiting the characteristics of transitive, intransitive-processive, and stative verbs (Straight 1976b). Here too, the morphosyntactic and pragosemantic similarities of these roots as both arguments and predicates in agent, actor, and possessor paradigms provide further evidence for widespread verbo-nominal root polyvalence in Mayan languages.

To understand these issues, we need to examine the marking of person in Maya verbs. **Table 2** contains the two sets of person markers found in Maya, which (following Lucy 1994) I here refer to as nominative and absolutive, while **Table 3** provides examples of the uses of these two sets of markers.

Looking first at psycholinguistic processing, we can presume that the possible representation of roots as morphosyntactically ambivalent resides, as with ambiguity of all kinds, on the receptive side of the divide between the neurocognitive processes that support construing and the neurocognitive processes that support saying. **Figure 1** presents an overview of the RIFE (Receiving-Interpreting-Formulating-Executing) Model of Language Processes (Straight 1999) structured around this doubly-dissociated divide.

| With ‘nouns’:                                         |                                                       |                                                                      |
|-------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------|
| 1. Possession (nom-):<br>cf. adjectival attribution:  | <i>Leti’e’ in-tsiimin.</i><br><i>Boox in-tsiimin.</i> | ‘This (is) my horse (< tapir).’<br>‘My horse (is) black.’            |
| 2. Attribution (-abs):<br>cf. adjectival attribution: | <i>J máak-ech.</i><br><i>Boox-o’òb.</i>               | ‘You (are a) person.’<br>‘They (are) black.’                         |
| 3. Poss-attrib (nom-...-abs):                         | <i>Aw-atan-en.</i>                                    | ‘I (am) your wife.’                                                  |
| With ‘verbs’:                                         |                                                       |                                                                      |
| 4. Intransive (nom-):                                 | <i>Táan in-kaan.</i>                                  | ‘I’m learning (lit. my learning is going on).’                       |
| 5. Stative (-abs):                                    | <i>J lúub-e’ex.</i>                                   | ‘You-all fell (lit. you-all are fallen).’                            |
| 6. Transitive (nom-...-abs):                          | <i>Táan uy-il-ik-ech.</i>                             | ‘He’s seeing (looking at) you (lit. his seeing of you is going on).’ |
| 7. Processive (nom-):                                 | <i>Tsoók u-lúub-ul.</i>                               | ‘He has fallen (lit. his falling is over).’                          |
| 8. Perfective (-abs):                                 | <i>Il-naj-o’òn.</i>                                   | ‘We saw (lit. we are having seen).’                                  |
| 9. Causative (nom-...-abs):                           | <i>Táan a-kan-s-ik-en.</i>                            | ‘You’re teaching me (lit. your causing of me to learn is going on).’ |
| 10. Passive (nom-):                                   | <i>Tsoók a-kan-s-a’ál.</i>                            | ‘You’ve been taught (lit. your being made to learn is over).’        |

Table 3. Examples of uses of Maya person markers.

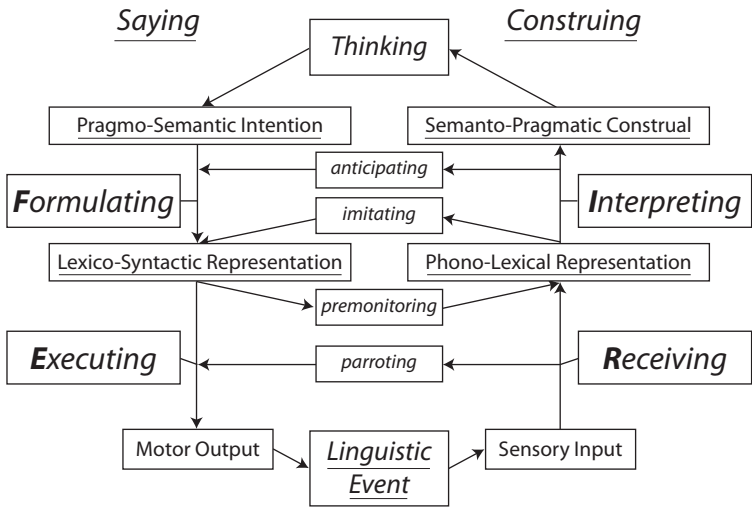


Figure 1. The RIFE model of language processes (modified from Straight 1999).

The semantic content of a speaker’s intention presumably lacks the ambiguity that a listener (or even the speaker as self-monitor) may discern in the output that the speaker produces. In other words, except by virtue of pre-monitoring of their output, speakers cannot know until they have produced (or at least thought of producing) a given output that this output contains ambiguous linguistic forms. Puns are

|                                                       | TRANSITIVE                                                | INTRANSITIVE                                 |
|-------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------|
| Inherently <b>transitive</b> verb: <i>kʰax</i> ‘tie’  |                                                           |                                              |
| Imperfective<br>(durative)                            | <i>Táan in-kʰax-ik-oʔob.</i><br>‘I am tying them.’        | <i>Táan in-kʰaax.</i><br>‘I am tying.’       |
| Perfective<br>(completive)                            | <i>T-in-kʰax-aj-oʔob.</i><br>‘I tied them.’               | <i>J kʰaax-naj-en.</i><br>‘I tied (things).’ |
| Inherently <b>processive</b> verb: <i>kʰooy</i> ‘dig’ |                                                           |                                              |
| Imperfective<br>(durative)                            | <i>Táan in-kʰooy-t-ik-oʔob.</i><br>‘I am digging them.’   | <i>Táan in-kʰooy.</i><br>‘I am digging.’     |
| Perfective<br>(completive)                            | <i>T-in-kʰooy-t-aj-oʔob.</i><br>‘I dug them.’             | <i>J kʰooy-naj-en.</i><br>‘I dug (things).’  |
| Inherently <b>stative</b> verb: <i>lukʰ</i> ‘leave’   |                                                           |                                              |
| Imperfective<br>(durative)                            | <i>Táan in-lukʰ-s-ik-oʔob</i><br>‘I am taking them away.’ | <i>Táan in-lukʰ-ul.</i><br>‘I am leaving.’   |
| Perfective<br>(completive)                            | <i>T-in-lukʰ-s-aj-oʔob.</i><br>‘I took them away.’        | <i>J lukʰ-en.</i><br>‘I left.’               |

**Table 4.** Three classes of verb root in Maya.

discovered, not created. The selection of a particular lexical item, or morphological pattern, or syntactic construction, presumably occurs on the basis of an unambiguous expressive intention. To put this in neurocognitive terms (after Lamb 1999), the flow of activation down a particular pathway to a given node occurs irrespective of other pathways that may also activate that same node. Only an upward flow, triggering other interpretive pathways connected with that node, or, in the model I prefer (Figure 1), involving corresponding receptive nodes activated by horizontal connections from the anterior to the posterior lobes of the brain, can make the speaker realize that a given output, or candidate output, may trigger unintended interpretations in the listener. Consequently, the morphosyntactic structures of a given utterance, including the lexical items that occur in them, presumably contain only monovalent entities with respect to the processes by which a speaker produces them.

In the RIFE Model depicted in Figure 1, language is completely dialectical in its processing, such that no pathways or nodes are held in common between expression and reception (Straight 1971, 1976c, 1980, 1986, 1992, 1993, 1999). For purposes of exposition, then, the present paper employs this unusual bi-representational model, even though nothing about the points being discussed hinges on whether this or one of the more usual uni-representational models proves correct in the long run.

Looking now at the specific examples of polyvalent roots, we find three classes of verb root identified by most linguists in the post-Colonial era (López Otero 1912 and 1968, Tozzer 1921, Andrade 1940, Blair & Vermont-Salas 1965 and 1967, McQuown 1967, Owen 1968, Bricker 1981, Lucy 1994). Examples of these appear in the paradigm presented in Table 4. Table 5 summarizes the examples given in Table 4 in terms of marked versus unmarked morphological patterns.

| Verb type                       | Aspect                     | Transitive                               | Intransitive                            |
|---------------------------------|----------------------------|------------------------------------------|-----------------------------------------|
| Inherently<br><b>Transitive</b> | Imperfective<br>Perfective | <u>Unmarked</u><br><u>Unmarked</u>       | Long vowel<br>L.v. + <i>-naj-</i>       |
| Inherently<br><b>Processive</b> | Imperfective<br>Perfective | Marked: <i>-t-</i><br>Marked: <i>-t-</i> | <u>Unmarked</u><br>Marked: <i>-naj-</i> |
| Inherently<br><b>Stative</b>    | Imperfective<br>Perfective | Marked: <i>-s-</i><br>Marked: <i>-s-</i> | Marked: <i>-ul</i><br><u>Unmarked</u>   |

**Table 5.** *Unmarked versus marked patterns in Maya verb forms.*

The largest group of native roots, which constitute a relatively fixed set because of the now exclusively non-native (Spanish and English) sources of new lexical items, is the ‘inherently transitive’ set. John Lucy (1994:629) estimates the size of this group of roots at 500+. The second largest group of native roots, the ‘inherently processive’ set, which has ‘[w]ell over 100’ instances by Lucy’s estimation, also contains all of the verbs borrowed from Spanish, which of course come to predominate as types (though not as tokens) in the output and input of adult Maya speakers and listeners. Interestingly, these verbs are borrowed in their infinitive form, which patterns like a noun rather than a verb in Spanish, and uniformly receive the same *-t* derivational suffix that is used to convert native noun roots, such as *míis* ‘broom’, into verb stems, such as *míis-t-* ‘sweep’. Finally, the most nominal but also the smallest group of native verb roots, with ‘fewer than 75’ exemplars, is the ‘inherently stative’ set, which patterns as much like adjectives as nouns.

To understand this last point, and to get a clearer picture of the morphosyntactic facts that underlie the whole controversy over the verbo-nominal polyvalence of Yucatec roots, we need to look again at the structure of Yucatec propositions, for nouns and verbs, and for adjectives, too. (See **Table 2** and **Table 3**.)

It should now be clear that only painstaking inquiry into the time course and phenomenology of receptive processing, plus measures of the subsequent use of heard items in productive patterns, can reveal whether, when processing putatively polyvalent input, a listener’s morphosyntactic parsing and lexico-semantic interpretation end up treating these entities as polyvalent. Measures of such treatment consist primarily of the application to a given root of verbal, nominal, and adjectival derivational and inflectional patterns. If such application occurs, further study can help us choose among a number of different accounts of how a listener-speaker might ‘represent’ this polyvalence. I put ‘represent’ in quotes because the issue is of course not only of representation *per se* but rather of configurations (and receptive-expressive discrepancies of configurations) among connections between the interpretive and executive nodes involved in a given example of language perception or production. One possibility, of course, is that the listener as speaker will add derivational affixes (*-t-*, *-s-*, and a few others not mentioned here) to roots on the basis of executive routines triggered automatically by the relative attributive (adjectival) or substantive (nominal) semantics of the root involved. Another possibility is that both the speaker and the listener will treat these derived

forms as unanalyzed wholes, in which case polyvalence exists more in the eye (and mind) of the linguist than in the ear (or brain) of the listener.

Given these considerations, it should come as no surprise that scholars have argued vigorously over the correct handling of Yucatec verbo-nominal morphology. Most recently, Christian Lehmann *et alia* have put forward evidence for a claim that the Yucatec pattern of 'possessive constructions, experiential constructions, and benefactive constructions', among other things, indicates that Maya favors 'relational prominence' over the 'person prominence' they find in 'Standard Average European' languages, using Whorf's famous term (Lehmann *et al.* 2002). Similarly, Robert D. Bruce, whose native-like mastery of Maya was legendary, concluded that while 'Occidental languages classify the elements of reality... as either NOUNS or VERBS' (Litzinger & Bruce 1997:8), in Maya 'Everything in human experience is conceived of as belonging to and/or possessing some other entity, either as a manifest phenomenon (BAAL [ba'al, associated with the Set A nominative prefixes]) or as an attribute (BIK [associated with the Set B absolutive suffixes])' (9):

In the BAAL possession of *tsimin* 'horse, mule, donkey or tapir = a large herbivorous beast'. *Wa a tsimin?* 'Is it your horse?' However, in the BIK possession of the same *tsimin*, it is not the entity or phenomenon that is grammatically possessed, but rather the QUALITY OR CONDITION: *Wa tsimin-ech?* 'Are you a dumb brute?' This expression, often used familiarly, means 'Don't be stupid'. (Litzinger & Bruce 1997:10)

Unfortunately, Bruce was more polyglot than linguist: His brief account of Mayan grammar does not consistently show a correspondence between Set A and Set B person markers and this alleged BAAL/BIK distinction.

Looking at this phenomenon from the standpoint of first-language acquisition, we can easily surmise that the above-described dynamic tension between receptive and expressive processes exists in, indeed results from, the dynamics of language development itself. Interestingly though perhaps not surprisingly given their predominance as lexical types, Barbara Pfeiler (1998) found that in very early child language (ages 1;9 to 2;4) inherently transitive roots greatly predominate over inherently processive or inherently stative verbs in transitive verb phrases. Unfortunately, she did not report on the occurrence of non-transitive verb phrases (processive, stative, passive, and other), nor on the occurrence of nominal and adjectival attributive clauses in her sample. She also did not report on errors the children presumably made in the semantic uses of roots or in their derivation or inflection; nor did she have anything to say regarding her subjects' interpretation of any of these verb forms when they heard them. Presumably the transitive-intransitive-stative-attributive-substantive continuum that characterizes the opposition between verbs and nouns results at least in part from cognitive commonalities that arise from universals of human experience and characteristics of perceptual processing in general. For clues regarding these commonalities, as well as how Maya children learn the adult-users' partitioning of

this verb-noun cognitive continuum, we need to look longitudinally not only at what children say but also at where it differs from adult patterns and how it compares with their own developing receptive performance.

Regardless of these variables, however, other studies of child language and cognition should lead us to doubt the validity of the early usage patterns observed by Pfeiler as guides to the language of older children and adults. Many studies have concluded that children under 3 don't make a clear noun-verb distinction, while others say that the transitive-intransitive dichotomy settles down only at age 4 or 5. For example, 3-year-olds are famous for such creative errors as 'Tell him to stay his straw out of my milkshake!' Clearly we need to look closely at Yucatec Maya-learning children's omission or misuse of person affixes (both Set A and Set B), derivational suffixes, aspectual particles, and the wide array of inflectional affixes that occur in verb forms before we can determine what they are doing in this domain. Finally, lexical representation undergoes radical change at about age 6, from decidedly holistic to much more compositional and syntactically complex internal structures (Straight 1981, Carey 1985, Heyman et al. 2003), so it is in the 5–7 age range that we might expect the most action to be occurring in verbo-nominal derivation and inflection for learners of Yucatec Maya.

A combination of naturalistic observation and experimental investigation should help us to determine whether and in what ways children's early interpretations and developing uses of lexical roots exemplify, and in fact create and perpetuate, both the real or apparent verbo-nominal polyvalence of Yucatec Maya roots and the seeming micro-diachronic (i.e. developmental-psycholinguistic) push toward monovalence, in which increased syntactic and semantic sophistication leads children to recognize and to productively employ, in both receptive and expressive performance, the patterns that exist in morphologically complex verbo-nominal stems.

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## MESSAGE ORGANIZATION IN AUTISM SPECTRUM DISORDER

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AUTISM SPECTRUM DISORDER (ASD) is a neuropsychiatric developmental disorder characterized by core impairments in social communication, especially in spoken discourse. Individuals with ASD fail to develop basic social skills. There are various diagnoses along the spectrum, the milder of which are most often diagnosed as Asperger's Syndrome. From mild to severe, social communication impairment is a shared trait across the spectrum. Considerable knowledge has been gained in categorizing the various communication breakdowns that make up these impairments but as yet, little is known about why they occur. A common impairment is in the area of message organization.

There are several theories of ASD, with at least one specifically addressing social communication impairments, but none deal with all the difficulties in ASD communication. In particular, none of the theories deal with the problems related to information structure and message organization which, it is suggested, are a commonality in the autism spectrum. This paper brings a linguistic perspective to the question of social reciprocity in ASD and considers two observable and consistent patterns of social communication impairment, both related to message organization. The patterns observed are discussed in terms of a more global theory of model building and conceptual integration and a link is made between predictable patterns of linguistic behaviour in ASD and a pattern of single inheritance relations between instances and models. While the scope of this paper is limited to a discussion of two aspects of communication impairment, these are seen to be part of a larger overall pattern in ASD communication.

On a constant basis, our brains are engaged in processing information, available through the senses, including selecting some of the information from the multitude available, and constructing models depending on situations and context. In this way we are able to build models of generic situation. And these models are what we use to make sense of and communicate in the world around us. The models we create can be combined to make new models and we can extrapolate from the models we have—our knowledge of generic situations—to make interpretations about new situations. It's a way to process information quickly.

It is impressive that for most situations people are faced with every day, we can find a model that we can use to understand and cope with the context that is being presented to us. And while we are building these models to reflect our contexts all the time, we are also changing our models all the time. But it is remarkable also that there are people who are not building models in this way—people who have a different approach to model building. This is the case in Autism Spectrum Disorder.

- (2) qualitative impairments in communication, as manifested by at least one of the following:
- (a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
  - (b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
  - (c) stereotyped and repetitive use of language or idiosyncratic language
  - (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level

**Figure 1.** Communication-related DSM-IV criteria for ASD.

1. THEORIES OF AUTISM SPECTRUM DISORDER<sup>1</sup>. The theories of ASD that are widely known address some of the communication impairments associated with ASD, each slightly differently. Theory of Mind (hereafter ToM)—the theory that people with autism and related disorders cannot recognize that other people have mental states different from their own—handles many of the social communication impairments (Baron-Cohen 1995 *passim*). In particular ToM answers the difficulties people with ASD have with mind-reading and literalness and some of the pragmatic misunderstandings people with ASD experience. But ToM does not address the problems in model building.

The theory of Weak Central Coherence (hereafter WCC) describes the processing style of people with ASD (Frith 1989). With this theory, there is featural as opposed to global processing. WCC Theory helps with an understanding of processing information and how people take things in in pieces. Certainly it plays nicely in terms of how we use and process bits and pieces to make models. It also directs us toward thinking about how we have different planes of models. But WCC theory does not address what this means for the communication of individuals with ASD, and it has rarely been directed toward social communication, as ToM has<sup>2</sup>. Rather, the theory has mostly been applied to explain certain cognitive findings in ASD, like the capacity of those with ASD for certain tasks, special skills and repetitive activities.

2. IMPAIRMENTS IN SOCIAL COMMUNICATION IN ASD. A defining characteristic of ASD is impairment in communication skills. The diagnostic criteria and instruments focus on the areas of communication behaviour and reciprocal social interaction, both of which concern language. The remaining diagnostic area, stereotyped interests and behaviours, also includes communication, incorporating stereotyped language.

**Figure 1** indicates the role of communication in a diagnosis for ASDs. There is often language delay or a lack of development of spoken language, but even where an individual is speaking in sentences, there are problems in spoken conversation and social discourse. One of the most striking things about the discourse of ASD is the variety of

impairments found. The patterns of impairment in the spoken discourse of individuals with this disorder range from sounding like a sportscaster (pedantic speech), to topic inflexibility or flexibility (semantic drift). There can be problems with quantity of information (terseness and perseveration) relative to topic or situation. Often there are atypicalities in the rhythm and intonational patterns (de Villiers et al., forthcoming). Another notable pattern is that of chronological or serial organization.

The variance in the communication impairments of ASD is immediately observable and generally accepted—there is a varied profile in the discourse patterns of this disorder. What may be less obvious is that the patterns vary in predictable ways, and this predictability can be seen through a more delicate analysis. Moreover, when the problems in communication are considered in terms of a more comprehensive pattern of conceptual integration, they all fit a similar pattern. Occurring throughout the spectrum of autism, there is a lack of complexity, or connectivity, between the different areas of language.

Two highly predictable patterns will be considered in terms of their relationship to model building and conceptual integration: chronological or serial organization and prosodic impairment.

3. CHRONOLOGICAL ORGANIZATION. The following textual examples<sup>3</sup> from three different subjects display the characteristic chronological pattern of organization (specifically, theme-subject repetition substituting for anaphora, combined with a temporal sequencing).

In (1), quantity of information and linearity are both a problem. The larger story it is taken from is delivered in the same, chronologically ordered pattern. In fact, the story is so linear from start to finish that the plotline is very difficult to follow. All details are related as bits in serial. And the speaker never pauses in the course of the story to summarize or even state the point of the story (e.g. ‘you know, it took so long for that train to arrive’).

The pattern of full subject + predicate is evident and the repetition of full subject (‘the yellowish going north’) in place of other pronominal anaphora lends an interpretation of *new* information where *given* would be called for.

- (1) \*CHI: and I saw the yellowish going south at Bloor on the other side.  
 CHI: and the yellowish going north came.  
 CHI: and I saw the yellowish going south through the windows of the yellowish going north.  
 CHI: and I got in the yellowish going north.  
 CHI: and then the yellowish going north left from there.  
 CHI: then the yellowish going north went out into the tunnel the yellowish going north in the Rosedale.

In (2), the boy with Asperger's Syndrome is asked where he works. In a similar pattern, he provides a series of events connected in serial order and represented with a series of additive conjunctions, temporal markers and a full subject + predicate pattern.

- (2) EXP: so you travel from here to there?  
 CHI: yes.  
 EXP: oh really?  
 EXP: <that's> [>] quite a trip.  
 CHI: <yeah> [<].  
 CHI: uh ye yeah it is quite a trip.  
 CHI: we go on the van first.  
 CHI: and then and then we then we work # then we work um something like uh nine-thirty to nine-thirty to twelve [!].  
 CHI: then we have lunch at twelve at that.  
 CHI: then we start back at work at one o'clock.  
 CHI: and then we go right all the way through to four-thirty.  
 EXP: oh -: .  
 EXP: and what time does that get you back here?  
 CHI: well we take the um four-forty-five bus...

In (3), a boy with Asperger's Syndrome is asked what he had for supper. The example follows a similar pattern again, but with some ellipsis toward the end of the recipe. Interestingly, where there is *agent* and *agent+predicate ellipsis* (lines [12]–[14], in bold), there is a more pronounced pedantic quality.

- (3) [1] CHI: pork and rice casserole.  
 [2] EXP: oh that sounds good!  
 [3] CHI: yeah.  
 [4] EXP: how do you make it?  
 [5] CHI: # you uh # grease a casserole dish.  
 [6] EXP: uh huh?  
 [7] CHI: um -: then you put the uh # rice in first.  
 [8] CHI: then you put the porkchops on top of the rice.  
 [9] EXP: uh huh?  
 [10] CHI: then you uh # sprinkle two packets of onion soup mix on top.  
 [11] CHI: then you uh mix a can of mushroom soup and two cans of water together.  
 [12] **CHI: and then pour that over all.**  
 [13] **CHI: and then # cook it covered for one hour.**  
 [14] **CHI: and then uncovered for fifteen minutes.**  
 [15] CHI: and then it's ready.  
 [16] EXP: it sounds very -: good.

The patterns of serial organization can be related to Van Dijk's macrostructures, and other theories that consider how people construct global semantic categories to organize and reduce complex information (e.g. Hasan's [1989] generic structure potentials or Gregory's [1988] generic structure schemas). People with ASD have problems constructing gists or global meanings so that with ASD there is no abstraction from the detail to construct conceptually more general linguistic representations. In his work on macrostructures, Van Dijk (1980:147) writes that 'without this level of semantic or information mapping, what you [would] only have is numerous links between all the information units at the local level'. And this is in fact the pattern that can be seen in the sequences of actions described in the above chronologically organized texts. In each case there are serial ordered relationships (elements related in chains), and problems with quantity of information relative to situation. What is lacking is generic structure.

An explanation can be put forward of single inheritance relations (Hudson 1990, Asp 1997). In ASD the processing happens in discrete bits. There is a bias toward detail-oriented information processing and information is not pulled together in the usual ways, to give a more global category. Incorporating the notion of inheritance relations, typically the integration process we have in our higher order information processing involves inheriting properties from multiple models, but with ASD there is a pattern of single inheritances. They are not inheriting from multiple domains—the models of inheritance are isolates. Rather than abstracting from the details to form prototypes and build conceptual models, with ASD, the instances perpetually override the relevant models. Another way to look at this is in terms of generalization. People with ASD have trouble recognizing generic conventions, so they have problems with generic structure.

**4. PROSODIC IMPAIRMENTS.** The second predictable linguistic pattern to be considered is prosodic impairment. The language of ASD is often associated with an atypical intonational pattern, in which prosody and pitch are unvaried and wooden. In various scales and diagnostic criteria, the intonational patterns of people with ASD are identified as atypical, both in terms of a characteristic flat or choppy intonational quality and in the placement of contextually unsupported or unexpected phonological stress. (de Villiers et. al., forthcoming). An alternative perspective is offered here, where the intonational patterns are recognized, not in terms of their degree of typicality or atypicality from the norm, but in terms of the degree of complexity in the intonation system. Languages have their own rhythmic pattern. And individuals develop their own, very individual rhythmic patterns in speech as well. But despite the fact that we have such personal rhythm patterns—even things like speed are part of this—we accept each other as unimpaired or typical, to a certain extent.

With ASD, the registering of associations is not the same. The pattern of single inheritances gives problems with assigning relevance to intended significant linguistic contrasts according to different situations and audiences. As a consequence, the relevant contrasts between rhythmic patterns and contexts are not made. Instead, what is often found in ASD is a characteristic flat, staccato pattern of intonation. It is a

pattern that does not change with context, likely because the individual has not registered the changes in context. So it's simplified. This is what people are responding to when they notice the flat, sometimes choppy, intonation pattern in ASD—not so much atypicality, but a lack of complexity in the system. The rhythmic and intonation patterns have less variety than speakers typically include.

This principle of a lack of variety or complexity can be posited throughout the linguistic system. Not only does intonation penetrate the entire linguistic system, but it may be that the lack of development seen in the intonation system can explain difficulties in other areas of the grammar as well. To take an example, in ASD there are problems with turn-taking and length of turn. In particular, people with ASD are often considered terse, providing polar responses with no supplementary information. Interactionally, the expected rhythmic patterns of exchange are not linked to their contexts. For most speakers, there are patterns of rhythmic response and exchange that a person needs to follow to be responsive within a particular context. But if people are not integrating the relevant intonation patterns and contrasts with context, and in particular if the models of inheritance are single models, then there may not be a recognition of the need for rhythm and response in certain situations and there may also be an inflexibility in their patterns of response in particular contexts.

In terms of the pragmatic difficulties people with ASD face as well, there are problems with relating instances to generic structure. Thus people with ASD invariably access the wrong generic situation, particularly where there is ambiguous linguistic representation. In ASD, there are single (as opposed to multiple) inheritance models, so there are single correspondences between generic situations and their linguistic expressions. Expressions are used repetitively, but not generalized to new instances. One of the effects of this is stereotyped or formulaic sounding language.

## 5. IMPLICATIONS.

**5.1. COGNITION.** In looking at how these linguistic patterns relate to cognition, what they suggest is that there may be a lack of integration in ASD. In cognitive terms, there may be access to different domains but no transferability, and in some cases there may be imbalances in access. The neural work is just starting to inform the relationship of neuronal activity to language related difficulties, but the lack of complexity seen in the predictable prosodic and pragmatic information structuring patterns suggests that people with ASD may lack the connectivity to be able to sort and link patterns of instances together to make or relate higher-level categories. This explanation may tell us about disparate impairments in ASD. It has a fit with the special interests associated with Asperger's Syndrome, and has implications for perseveration and special capacities. It fits too with current work on attention where people with ASD have trouble shifting their focus from one focal point to another or dividing their attention between two fields.

In terms of the other characteristic linguistic patterns of ASD, the explanation is similarly integrative in that it may speak to all of the impairments in social reciprocity and communication associated with the disorder. That is, seen in this light, it is



possible that the social communication impairments in ASD represent compensatory techniques for a limited range in realizing generic structure. It may be that chronological, serial organization is substituting for generic structure or represents a limited repertoire for generic structure. Similarly, with pedantic speech and perseveration, it may be that the use of factual (expert) information, and the use of stereotyped language or linguistic formulas are substitutes for, or elements of, generic structure.

5.2. TREATMENT. The concept of a limited repertoire in the communication of people with ASD has treatment implications. There are currently no adequate interventions for conversation skills for people with ASD. Most people agree ToM cannot be taught. Yet social communication impairments are an important area for remediation, greatly impacting quality of life. If even some of the problems seen in ASD communication are linked to a limited repertoire, it points in a useful direction—increase the repertoire.

By working toward increasing the variety of intonation patterns that can be used with particular expressions in particular contexts, it may be possible for people with ASD to develop their rhythm patterns and to operate with an increased level of variety. By working toward flexibility and against the fixed routine, building along the line that there is always an alternative, it may be possible for individuals with ASD to improve their facility for hearing and repeating different patterns and rhythms of speech (according to different situations and audiences). Whether this could be generalized is an important question, but the increased repertoire itself might help them to fit in.

<sup>1</sup> For a current review of the major theories of autism see Frith 2003.

<sup>2</sup> ToM is certainly aimed at accounting for social communication problems, but there are predictable patterns in ASD communication that this theory does not account for, such as message organization.

<sup>3</sup> Symbols follow CHAT conventions of the CHILDES language data exchange system:

EXP = experimenter  
 CHI = child  
 [>] = overlaps with following text  
 [<] = overlaps with preceding text  
 [!] = marked stress  
 # = pause  
 -: = syllable lengthened

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IV



LANGUAGE  
ACQUISITION





# HERITAGE LANGUAGE MAINTENANCE IN CHILDREN OF INTERNATIONAL SCHOLARS

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INTERNATIONAL SCHOLARS from many countries come to the United States to pursue advanced degrees, often bringing a child or children with them. A pilot study of seven international graduate students and their families was undertaken to investigate the stances and strategies that facilitate successful models of heritage language (HL) maintenance and the factors that detract or undermine this process during the acquisition and development of English (L2). (Heritage language is defined here as that which respondents identify as their primary native language, in which they are most proficient and whose culture they identify as their own.) All participants plan to stay in the U.S. with their children for a restricted time until one or both spouses receive an advanced academic degree. This significant population at universities has been neglected in language maintenance studies and is not included in any of the recent research reviewed by Garcia (2003).

1. **PURPOSE.** This report focuses on two representative but contrasting cases to gain insight into the perspective of international mothers enrolled in graduate studies and their school-aged daughters. One of the chief goals was to examine the beliefs of subjects (both mothers and their daughters) concerning the resilience of HL during L2 acquisition and their stated awareness of difficulties which HL maintenance and development might pose.

Other key points investigated included the perceived vitality of the HL community and the degree to which participants felt its cultural and linguistic support as well as the intensity of effort they felt necessary to personally invest in the process. Of particular interest were domains of HL use and perceptions regarding HL erosion. The study relied on self-reports of participants to arrive at an assessment of beliefs and strategies contributing to HL maintenance or loss.

It was assumed that well-educated, linguistically aware parents would have a clear plan and strategies for HL maintenance, that the intention to return to the home country would lead to greater focus on maintenance and development of academic L1, and that they would find supportive HL communities or clubs on campus. However, in five of the seven cases in this pilot study, none of these assumptions were found to be true.

2. **BACKGROUND.** While the research literature acknowledges the important role of the family (Garcia 2003, Kouritzin 2002), the specifics of what happens in familial speech

environments have been explored in far too little detail, mostly as retrospective case studies which are not explicit about daily practices and strategies (Dopke 1992, Guardado 2002). Fishman (1991) maintains that the key to a model of intergenerational language maintenance is face-to-face interaction in smaller social circles (such as the family or the immediate community). This model presupposes that a functioning family unit and community exist where the HL is spoken. In the case of international graduate students and their spouses, geographical separation for longer periods is not uncommon and HL speech communities answering the needs of scholars and their children cannot be taken for granted. Fishman (2000) gets to the heart of HL maintenance in isolation when he asserts that this process must reside in the home, guided primarily by women interacting with their children. The pivotal role of the mother is underscored in Kouritzin's sobering essay describing her decision-making and emotions regarding family language choice and use (Kouritzin 2000).

3. **SUBJECTS.** Seven families representing six nationalities were selected from twelve who volunteered for a pilot study. These seven were chosen on the basis of background questionnaires which identified mothers or fathers involved in graduate study who had school-aged children. Mother-daughter pairs emerged as the principal unit of investigation, with two exceptions where fathers were interviewed because of their greater English proficiency. The sample consists of well-informed, literate parents who are well-versed in the literature and history of their respective cultures and hold high expectations for their children's education and academic achievement.

All subjects expressed the goal of L2 English acquisition for their children as the family sojourns in the United States (ranging from 4–12 years) during the parents' studies. All intend to return to their respective countries. Thus, these are not political or economic refugees, migrants, or parents who do not share the same language and culture—as is the case in many studies on language loss and maintenance. All children in the study attend local elementary schools near the university. School staff members are known for their efforts to honor the multitude of cultures, but are less encouraging of native language maintenance.

4. **METHOD.** The pilot study began with a factual background questionnaire, addressed only to parents, seeking information regarding linguistic and family background, schooling in HL and L2, length of stay in the U.S. for both parents and child(ren), ages and ratings of linguistic ability of children and degree of English usage in the home. This first questionnaire also requested written responses to eight open-ended questions asking parents to report on current as well as earlier HL maintenance strategies, practices, and interactions, including HL and L2 literacy instruction. Follow-up oral interviews of an hour each with a mother, and later with one daughter were taped and transcribed for further analysis.

Daughters were asked for their own descriptions of linguistic practices and for a self-assessment of linguistic ability (both oral and literate). Mothers were asked to pinpoint specific behaviors or critical junctures which led to decisions on the part of

parent or child leading to successes or failures in HL maintenance. Specific questions regarding domains of language use, difficulties, and perceptions of support from a linguistic community were sought to pinpoint fissures (e.g. code-switching or mixing the vocabularies of the HL and L2, the increase of English usage within the home and general language shift).

In the two cases presented here, both spouses were juggling studies toward the doctorate while supporting L2 acquisition and L1 maintenance in their school-aged children. Information gleaned from the larger study is also cited to illustrate and underscore converging factors. The first case illustrates a welding of duty and desire by the child in maintaining and developing HL, while the second illustrates the exact opposite: an active resistance to HL maintenance.

## 5. RESULTS.

5.1. FIRST CASE: FAMILY OF SLAVIC BACKGROUND, MOTHER A AND 12-YEAR-OLD DAUGHTER, M. The family arrived in the US with a one-year old daughter M and her 2.5-year-old brother. The father was pursuing a doctorate in the sciences at a large Midwestern university while the mother began English lessons at a community center. Later, the mother (A) enrolled in a Master's and PhD program in linguistics while also teaching courses as a graduate instructor at the university. During the next eight years A had two more children. The duration of their stay in the U.S. was 11 years; the interviews took place one month before their final return.

From the questionnaires and interviews with the mother a picture emerged of an extremely resolute, driven individual, totally absorbed with learning English herself and raising her four children bilingually. A and her husband spoke exclusively HL at home and the only incursions of English were through restricted television viewing and occasional visitors. They felt this strategy to be necessary, because the family was in total isolation from a HL speech community. The stance of the parents toward child-rearing was one of consistency and common sense, in which rules and expectations were clearly delineated.

Literacy was slowly introduced to the children through HL storybooks, with both husband and wife reading to the children until the children could read for themselves. (Only one other mother-daughter pair in the larger study reported such success.) A expressed a wish to create for her children as HL an upbringing as possible. She implemented this plan by providing her children with a rich library of books and organizing the home linguistic and cultural environment to approximate life 'at home'.

A also felt very strongly that the U.S. curriculum did not meet the more rigorous standards of the 'home' schools. This belief led to pragmatic strategies to insure that her children could rejoin their age cohorts when they returned. Her daughter M attended a local American school, but the mother additionally invested two hours daily to home schooling the children in the HL curriculum with the help of textbooks sent to them by relatives.

Preservation of the HL was initially not foremost in her intentions—keeping them scholastically abreast of their peers at home was. Among the seven families in the

study, five downplayed the importance of maintaining pace with the children's scholastic and age cohorts in the native country, feeling that the academic and social success of their children in English was paramount. Four felt that the HL was resilient enough to bounce back upon return to their native country; their children would relearn what they had lost in the HL and catch up to their peers with relative ease. They did not feel the need for achievement of 'balanced bilingualism'—if English became more dominant over the years, the HL would rebound.

Initially A was relatively unconcerned with HL maintenance because she reasoned that speaking HL with her children and home-schooling them would suffice. But she describes a critical juncture when the two older children were in third and fourth grade respectively. She noted an escalation in code-switching and their decided preference for English—a phenomenon that several families in the study reported. A commented: 'I had heard about children losing some functions in their heritage language, but I just couldn't imagine that could happen to us. All of it starts so slowly—and suddenly it's such a struggle.' Similarly, Dorian (1982) refers to the loss of a full complement of language functions or forms as a sign of language erosion.

After seven years abroad, often separated from one another, the parents made the financial sacrifice to return home with the children for a month. In the words of the daughter, M, 'When we were there, all our relatives and friends would say that we spoke [HL] with an English [American] accent. It made me feel really bad.' The resolute stance that HL must be the exclusive language of the home had always come from her parents—especially her mother. But M reports that after the trip, she and her brother made the conscious decision to make it their rule as well, essentially internalizing the parental wish.

With the erosional effects of the L2 and the lack of a HL speech community, the parents thought it crucial to HL maintenance and to the children's eventual re-acclimation to HL culture for the father to take M and her brother home every two years. During these visits, they were tested orally and in writing by a local school to ensure that they were keeping up with the HL academic demands. It was clear from M's interview that certain domains of English language use (i.e. terminology and discussion of school subjects) had not transferred to the HL. She described chiefly lexical and semantic difficulties when she assessed her skill in the HL language and her lack of formal knowledge of syntactic features.

M indicated that she was not overwhelmed by these deficits and, like her mother, felt that the informal familial language she had learned at home could be 'upgraded' with reading, composition and study. She explained that every year in school increased the information load which she could not transfer to her limited HL lexicon. Although she worked diligently with the HL schoolbooks with her mother's help, there was insufficient time to bring her HL linguistic competence in the academic domain to the same high level she had achieved in English.

Even in this most adamant of households where philosophies are linked with practical strategies and rules, the mother was most concerned about the erosion in the HL of her two younger children (ages 8 and 4). She had underestimated the need for



greater attention as her children approached third grade, when social forces and sudden spikes in cognitive growth and academic language demands manifested themselves, causing accelerated language shift in the two older children.

Since they were permanently returning to the home country, A was not very concerned with the linguistic deficits of her two younger children. Her eight-year-old could, with diligence, catch up by trusting in the social and linguistic forces that would pull the children's language into synchrony with that of their native peers. But she stands alone among the seven families in her absolute stance and consistent adherence to a HL-only policy within the home, in the amount of time she devotes to HL maintenance through home schooling, and in her efforts to raise her children not only bilingually but also biculturally. Among the families, she and her daughter report the highest success rates.

**5.2 SECOND CASE: ASIAN MOTHER CW AND 10-YEAR-OLD DAUGHTER J.** In stark contrast to the unity of purpose and commitment to the heritage language of parents and daughter is the case of 10-year-old J. CW and her husband came to the university from Southeast Asia three years ago, after J had completed the first month of first grade. Her older brother is 12 and had three years of formal schooling at home. The father is completing doctoral studies in international law, while the mother has started another advanced degree in pedagogical linguistics.

The mother's poignant words in a graduate class about her daughter's growing cultural and linguistic alienation from the HL and culture were pivotal in conceiving of this study. She had related how her daughter's quick acclimation to American life and her wish to assimilate caused an upheaval in her cultural identity and a rejection of her HL heritage. Being very social, J had made several American friends and wanted to be like them. She refused to talk in HL, answering in English, and told her mother she wanted blue eyes and blond hair.

Questions to the mother about their HL maintenance strategies yielded a picture of a sensitive, devoted mother whose goal was to have a harmonious relationship with her children. In all aspects of child-rearing, she expressed great concern for their emotional well-being and happiness. Like all the mothers and the two fathers in the larger study, CW had high expectations for her children's scholastic and personal achievement and was initially most concerned with their acclimation to life in America and their L2 learning. Like five of the seven families studied, she assumed that the children's HL would remain if she continued to speak HL with them and with her husband. She did not feel that she had to make any specific plans for maintenance and development of the HL—that would come naturally. Her alarm was only raised late when she realized that her daughter's unwillingness to speak HL actually was masking rapidly diminishing linguistic ability. It was a shock when J's reluctance to speak HL hardened into resolute resistance. The mother had not experienced these reactions to HL use with her son. However, she believes it would be wrong to force the issue of HL use in the home, because it would serve to alienate her child from her. Several mothers in the larger study also expressed this belief but developed strategies

to make HL use more enjoyable for the child by taking a lighter-hearted attitude toward language, introducing games and rewards into the learning process. Miscues on the part of a child were reported by one other Southeast Asian mother to be opportunities for joking and adept correction.

J's grade level literacy needs in HL have only recently been addressed in the form of some worksheets from home which the mother felt J should fill out independently due to the parents' busy academic schedules. Although CW reported that her daughter has the most rudimentary skills in reading and writing, there is not enough time to do the one-on-one instruction that is necessary.

Most of the children in the seven families in the study expressed a degree of reluctance to work with the parents on improving their HL, but with J, the challenge looked even less attractive: 'It would be more easier if I did speak Korean, but then it would be hard for me and I would have to work with my mom or dad'. 'Would that be so terrible?' I teased. 'Well, if I did it by myself, it would be more quicker. Dad helps me and he expects a lot and then goes on and on and on'.

During the videotaped interview, J spoke in an interlanguage with pronounced developmental errors. Her English, while fluent, showed an incomplete mastery of syntactic structure and lexical choice. She showed great self-confidence and was very sociable, immediately taking to the camera and launching into her likes and dislikes about speaking HL. 'At first I spoke [HL], but now I speak mostly English; but sometimes [HL]'. 'Why?' 'Because in school and friends, I am more used to English'. She rated her English skills at nine out of ten as opposed to her HL skills at three.

Two other mothers in the study noted that when extended family members visited, the grown-ups tended to speak in longer discourse chunks to which the children merely responded with yes/no or short utterances which were rarely expanded. But it was only at this point that they noted decreased HL proficiency.

During the second half of her oral interview, J made it quite clear how resilient she felt her HL to be. She said she was not concerned about the academic or social consequences of returning home. She proceeded to list social strategies she would use to relearn her language: 'I will make friends, then invite kids to sit with me in school, then invite them home and just pick up HL'.

This facile view of re-acculturation and concomitant language (re)acquisition appears to be shared to varying degrees by five of the seven families in this study and may account for their lack of planning for HL maintenance and development. There was a general acknowledgment of an expected struggle in school upon the children's return home, but parent worries were often mitigated by a naive trust in the power of social forces in school and the resilience of the HL.

A curious sequence of events illustrated how an acceptance by the parent of lack of verbal expression also contributes to language loss. CW was seated off to the back and I asked J about code switching: 'When you come to a word or something you can't say, what do you do?' She told of a time she was talking to a newly-arrived HL peer and couldn't remember the word for 'Thursday'. I queried her on how to say this

in HL. She looked up for a moment and looked meaningfully at her mother, who immediately whispered the HL equivalent to her.

CW conceded that her daughter's resistance to speaking her HL hurt her deeply, but she had nevertheless lowered her demands with her child to just a few sentences each day, hoping this strategy would prevent her daughter from totally forgetting HL. She reported that even this request taxed their relationship. She realized in retrospect that it was a mistake when she first permitted her daughter to answer her in English. She did not realize that in the absence of a supportive speech community, the abdication of one of the primary sources for the HL constituted the beginning of a rift from it. She had come to two critical junctures in HL maintenance and had not recognized them in time: lack of a plan at the outset and lack of specific action when language shift from HL to L2 began.

5.3. DISCUSSION. The domains of HL use across all seven families in the study were usually reported to be a) informal use in the home with immediate family members and HL visitors, b) more formal phone interactions and visits with extended family and visitors using polite forms of address, c) attempts at literary/academic exchanges when commenting on HL readings and experiences outside the home. M reported that she would rarely write more than her name at the end of a birthday or Christmas greeting. 'My dad writes to our family in [central Europe], we just sign'. Social writing which could have motivated a greater need for self-expression was non-existent. 'I don't have any friends [at home] I write to.' She said she spoke only briefly on the phone to her grandparents because 'it costs a lot and mostly we just say hello and how we are'. J also reported that she didn't like to talk much on the phone to home 'cause I forget words and it's not so comfortable'. Thus, the opportunities to use the HL in meaningful conversations on topics that interest the children also are limited. This interest/motivation factor also explains elected isolation from non-age level cohorts where the children do not feel completely comfortable or have no shared interests.

In CW's case, the references to linguistic isolation from a supportive speech community were initially puzzling, as were the claims of several other mothers who speak relatively commonly occurring Southeast Asian languages around campus. Further exploration showed that from the family's vantage, unless there were peer-aged children who spoke the HL well, with whom their own children could interact, they felt deprived linguistically and culturally of sharing in a real language community. Several families reported that the linguistic pool shrank precipitously as did the incentive to speak, when peers returned to their countries or spoke the HL less and less. This perception of increasing linguistic isolation was reported by one East Asian mother of a seven-year-old daughter: 'She used to speak to her friends who had just come here but unfortunately, these friends gradually learned English and felt more comfortable communicating in their second language. But I always encourage my daughter to speak to them in [HL] even when they speak to her in English'. Thus, the degree of isolation from speech community is subjective to some extent—or more precisely personal, depending on the proclivities and needs of the family.

Most importantly, future researchers cannot simply assume a supportive speech community simply based on such factors as numbers and geographical proximity. Even when seemingly vibrant social groups exist with age-cohorts and activities geared to them, the actual linguistic quality of those cohorts and attractiveness of those activities for the subjects impacts on the degree to which a HL community is actually perceived to be supportive by target families.

6. CONCLUSION. These two case studies of HL maintenance in situations of relative or perceived linguistic isolation highlight the parental role as a critical factor in its success or failure. The strategies and stances that facilitate successful models of language maintenance hinge on a consistent adherence to the mission which is ideally shared and internalized by the children. Parental awareness of the complexity of raising children to maintain the HL and develop it further without a supportive speech community is essential, as are implicit or explicit policies and strategies for achieving that end.

Thus this study reflects the crucial need to link philosophy and conviction with planned strategies. Each of the participants in the study reported a desire to maintain the HL and culture in their children, but many responses revealed a surprisingly naive linguistic and pedagogic stance, despite several parents' advanced educational backgrounds in applied linguistics.

Only two of the seven families reported having HL maintenance plans which included the academic development of the L1 through the use of HL curricular materials or other means. Most attributed great resilience to the heritage language and to the innate linguistic and social forces of childhood. There was a general lack of awareness among participants of dangers posed to their children's heritage language and the natural erosion which occurs as a result of extensive L2 contact. While there was a keen awareness of language acquisition challenges, the possibility of language loss seemed so remote that it was not given due attention until problems became obvious—or even critical. As both sets of subjects highlighted in this mother-daughter study pointed out, once erosion in the linguistic environment of the home begins, reversal of the downslide is extraordinarily difficult.

There is a great need for far deeper probing of the dynamics and factors which lead to adherence and commitment to maintenance of the HL by children and the concomitant sacrifices necessary to do so. With parents who find themselves in relative or perceived isolation from HL speech communities, there is the need to recognize the unique and unnatural learning environment which commands a different approach than one would normally take toward language maintenance. Linguistic and cultural input is radically narrower both in quality and quantity, and measures have to be in place to facilitate further development as the children's intellectual capacity increasingly outdistances their linguistic capabilities in the heritage language.

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## CAREGIVER INPUT AND LANGUAGE DEVELOPMENT

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THE DIFFERENT WAYS that caregivers model specific grammatical components and the way that young children then acquire those same components have been the focus of work on child-directed speech or CDS (see for example an overview in Haynes 1998). What happens, though, when the caregiver does not share the same native language(s) as the child and may be exposing the child to non-native grammatical structures in the input? No published research of which I am aware addresses the effects of non-native language input on language development.

1. NON-NATIVE VERSUS NATIVE CAREGIVERS. This paper examines the effects of the discourse of non-native versus native caregivers on a young child's acquisition and use of German. The child's production in the company of a Chinese babysitter is compared with his speech production in the company of a German babysitter. The expectation is that the child would produce linguistic structures similar to those of his adult interlocutors, as has been found in studies of CDS (cf. Pine 1994; Richards 1994). Thus it is hypothesized that he would produce more incomplete German utterances of the type produced by the non-native babysitter when he is with his Chinese babysitter than when he is with his German babysitter. The child's German language behavior is also compared with that of his daycare peers to ascertain whether his development is typical of German-speaking children his age.

2. THE CASE STUDY. The subject of this study, Freddy, was born in Tokyo, Japan to a German father and an American mother. The child was exposed to German and English from birth and to Japanese from age 0;11 until 1;10 (year;month) in a full-day Japanese daycare (further details of the child's linguistic development before age 1;10 can be found in Quay 2001). The family moved from Japan to Germany when the child was aged 1;10. German was his weakest language at this point.

From age 2;0 onwards, Freddy was looked after at home by a series of babysitters for several afternoons each week. The parents settled on two regular babysitters: from ages 2;1 to 3;3 a German teenager, Jasmin, for 3 hours every week, and from ages 2;7 to 3;3, a 28-year-old Chinese woman, Xinxin, for 9 hours each week. Freddy also attended a German daycare from ages 2;4 to 3;3 for 5 hours each weekday.

In the week before his third birthday, the child was video recorded with his Chinese and German babysitters as well as at his daycare. The babysitter from mainland China began taking care of the child one month after arriving in Germany and communicated with the child in German as she was learning the language. She was able to

|                                             | Xinxin | Freddy | Jasmin | Freddy |
|---------------------------------------------|--------|--------|--------|--------|
| No. of utterances                           | 651    | 198    | 930    | 402    |
| No. of turns                                | 170    | 165    | 350    | 341    |
| Average length of each utterance (in words) | 2.928  | 2.712  | 4.213  | 2.883  |
| Average length of each turn (in words)      | 11.212 | 3.255  | 11.194 | 3.399  |

**Table 1.** Overall discourse structure.

speak some English on arrival in Germany but no German at all, so in her first month of babysitting, she spoke only English to Freddy. Xinxin reported that she switched to German once she started to learn the language. At the time of the data collection, the Chinese babysitter had already been caring for the child for six months, using English in the first month and predominantly German in the preceding five months. This paper focuses on one session with Xinxin where two different contexts were recorded—book reading and toy play. A similar session involving the same activities was also recorded with the German babysitter, Jasmin. These two sessions as well as one at the daycare, amounting to approximately three hours of recordings, have been transcribed and coded in the CHAT format of CHILDES (see MacWhinney 1995).

All of Freddy’s peers and adults at the daycare in Germany were monolingual German speakers. Of the eight other children in the German daycare, six were older than Freddy with the oldest girl being nine months and one day older while the youngest boy was four months and twenty-three days younger than Freddy.

3. RESULTS AND DISCUSSION.

3.1. OVERALL DISCOURSE STRUCTURE. **Table 1** shows that the Chinese babysitter, Xinxin, produced more than three times the number of utterances than the child produced for the whole session (651 for the adult versus 198 utterances for the child). The German babysitter, Jasmin, produced slightly more than twice the number of utterances as Freddy (930 versus 402 utterances). The two babysitters and the child shared the discourse interaction almost equally in terms of the number of turns each took: 170 turns for Xinxin as compared to 165 turns for Freddy and 350 turns for Jasmin as compared to 341 turns for Freddy.

**Table 1** also shows the average length of each utterance and the average length of each turn in terms of the number of words. Interestingly, while the non-native babysitter, Xinxin, and the child produced utterances of about the same length (Xinxin had a slightly higher average of 2.928 words per utterance while Freddy produced an average of 2.712 words per utterance), the native German babysitter, Jasmin, produced utterances that were about 1.5 times longer than the child’s (Jasmin at an average of 4.213 words per utterance versus Freddy at 2.883 words per utterance). But the average length of each turn (in words) of both babysitters was more than three times longer than the turns produced by Freddy.



| Marked Features | Xinxin | Freddy | Jasmin | Freddy |
|-----------------|--------|--------|--------|--------|
| Syntactic       | 25%    | 29%    | 2%     | 28%    |
| Morphological   | 8%     | 9%     | 0%     | 9%     |
| Lexical         | 5%     | 3%     | 0.5%   | 4%     |
| No coding       | 62%    | 59%    | 97.5%  | 59%    |

**Table 2.** *Non-native-like discourse features.*

Quantitatively, both babysitters had longer turns than Freddy, due in part to the fact that at one point both were reading to the child from books. A closer look at the transcripts revealed that Xinxin’s turns were qualitatively different from Jasmin’s turns. Xinxin’s turns were longer, mainly because of repetition, while Jasmin’s turns involved more new information.

3.2. DISCOURSE FEATURES PRODUCED BY BOTH SPEAKERS. When I looked more closely at the utterances produced by the two babysitters and Freddy as shown in **Table 2**, I found, surprisingly, that the child did not produce more utterances coded as being linguistically marked (or different from standard German constructions) with the Chinese babysitter than with the German babysitter, as earlier hypothesized. The child produced roughly the same amount of marked features in his speech in both sessions: 29% syntactically marked features in the session with Xinxin as compared to 28% with Jasmin, 9% morphologically marked features in both sessions, and 3% lexically marked features with Xinxin as compared to 4% with Jasmin. Interestingly, 59% of all his utterances were standard German constructions in BOTH sessions. This indicated that the immediate input from a non-native versus a native interlocutor had no major effect on the child’s speech at that stage of his German development. While the child did not exhibit much difference in his speech production in the two sessions, the two babysitters did differ greatly. The native babysitter had few linguistically marked features in her discourse. 97.5% of her utterances were standard German, as opposed to only 62% for the non-native babysitter. The rate of non-standard features in the Chinese babysitter’s utterances at 38% was only slightly better than the child’s at 41%. Both the Chinese babysitter and the child had similar rates of syntactically marked features at 25% for Xinxin and 29% for Freddy, of morphologically marked features at 8% for Xinxin and 9% for Freddy, and of lexically marked features at 5% for Xinxin and 3% for Freddy. The rate of syntactically marked features produced by Jasmin was negligible and will not be discussed.

Most of the marked syntactic features for Xinxin and Freddy were due to incomplete utterances. 94% of Xinxin’s syntactically marked utterances were incomplete. To a lesser degree, 73% of Freddy’s syntactically marked utterances with Xinxin and 81% of his syntactically marked utterances with Jasmin were incomplete.

3.2.1. INCOMPLETE UTTERANCES. To examine the incomplete utterances more qualitatively, they were further coded for omission of the following: subject, verb, object,

|                                             | Subject | Verb | Object | Article | Other |
|---------------------------------------------|---------|------|--------|---------|-------|
| Xinxin (N=152)                              | 43%     | 44%  | 13%    | 34%     | 8%    |
| Freddy in Xinxin interaction (N=41)         | 21%     | 43%  | 17%    | 26%     | 12%   |
| Freddy in Jasmin interaction (N=92)         | 33%     | 46%  | 17%    | 21%     | 3%    |
| Monolingual German peers in day-care (N=45) | 60%     | 27%  | 13%    | 18%     | 4%    |

**Table 3.** *Omissions from incomplete utterances.*

article, and others (which included prepositions, conjunctions, adverbs, relative and interrogative pronouns). As shown in **Table 3**, Xinxin was almost twice as likely as Freddy to omit subjects, mainly pronouns, in incomplete utterances. They were quite similar in the omission of verbs (which included modal and auxiliary verbs) and objects (also mainly pronouns). Verbs were missing from 44% of Xinxin’s incomplete utterances and 43% of Freddy’s. Freddy was missing slightly more objects at 17% than Xinxin at 13%. She omitted 8% more articles, both definite and indefinite ones at 34%, than Freddy at 26%.

The child’s marked syntactic features were quite similar to the babysitter’s in terms of proportion of utterances. This suggested that there might be some correlation between the babysitter’s imperfect grammatical model and the child’s production. But when I looked at the omissions from Freddy’s incomplete utterances in the Jasmin transcript, I found similar results for Freddy’s omissions (cf. highlighted rows of **Table 3**), showing that the immediate input he heard did not affect his general speech patterns with different interlocutors. When the results were compared with the omissions made by all the monolingual German daycare peers as outlined in the last row of **Table 3**, Freddy’s incomplete utterances did not reflect the pattern of omissions exhibited by his monolingual German peers. While his peers also produced incomplete utterances, there was a tendency to omit mainly subjects at 60% from their utterances, followed by verbs at 27%, articles at 18% and objects at 13%. For Freddy, verbs were omitted more often than subjects at an average of 44.5% for the two sessions versus an average of 27% for subject omission. Thus, Freddy’s order of category omission did not reflect that of his monolingual peers.

However, Freddy’s utterances were more qualitatively similar to those of his peers than to Xinxin’s utterances in terms of the number of parts of speech missing in each incomplete sentence. In **Table 4**, Freddy, like his German peers in the daycare, was more likely to be missing just one category. With regard to Freddy’s incomplete utterances (as highlighted in **Table 4**), 79% were missing one category in his interaction with Xinxin and 80% were missing one category in his interaction with Jasmin. His German peers omitted 1 category in 76% of their incomplete utterances. He produced no incomplete utterances with three categories missing. On the other hand, 57% of Xinxin’s incomplete utterances were missing one category, 35% were missing two and 6% were missing three categories. 2% of Xinxin’s, of Freddy’s and of his German

|                                     | 1 category | 2 categories | 3 categories | UNC |
|-------------------------------------|------------|--------------|--------------|-----|
| Xinxin                              | 57%        | 35%          | 6%           | 2%  |
| Freddy in Xinxin interaction        | 79%        | 19%          | 0%           | 2%  |
| Freddy in Jasmin interaction        | 80%        | 20%          | 0%           | 0%  |
| Monolingual German peers in daycare | 76%        | 22%          | 0%           | 2%  |

**Table 4.** Number of categories missing within each incomplete utterance.

peers' incomplete utterances were coded as UNC, as it was unclear how the error type should be classified.

**Table 5** (overleaf) lists 10 examples of incomplete utterances—4 from Freddy (X indicates the interaction with Xinxin and J indicates the interaction with Jasmin), 2 from Xinxin and 4 from four different children at the daycare. Xinxin in Example 5 had the most truncated utterance with a subject, verb and object missing. Freddy's incomplete utterances in Examples 2 and 3 were similar to those of his German peers in Examples 7 and 8.

Subject and object omissions in all the examples in **Table 5** were mainly pronouns. Xinxin, as in Example 5, could possibly be experiencing interference from her native language, Mandarin, which allows both subject and object arguments of a verb to be omitted (as described by Lee and Naigles 2002). Freddy, too, may be experiencing interference from Japanese, which allows subject pronouns to be dropped. Although he was dominant in Japanese in his second year of life, his family left Japan when he was still at a predominantly one-word stage so it seems less likely that his previous knowledge of Japanese would now interfere with German syntax. His case may be explained as a developmental stage in the mastery of German, as other young monolingual German-speaking children at his daycare also omitted subject pronouns occasionally as in Examples 7, 8 and 10. The use of pronouns in German is not as straightforward as in English, as pronouns are linked in gender, number and case to the nouns to which they relate (Tebbutt 2001). This may cause developing German speakers like Xinxin and Freddy more difficulties in mastering the pronominal system.

**4. SUMMARY AND CONCLUSION.** To summarize, at a macro-level, the purpose of this study was to look at caregiver input and language development. At a micro-level, this study is a first attempt at evaluating the effect of a beginner's non-native language model on a child's language production. The child had a similar proportion of linguistically marked features in his speech as his non-native caregiver did in her speech. However, when his speech with his non-native caregiver was compared with his speech with a native caregiver, no differences were found in the percentage of linguistically marked utterances. The comparison of the effect of the non-native and the native caregivers' speech on the child's production of German provided no evidence of a clear relationship between the child's speech and his input from adults with vastly different linguistic abilities. Interestingly, the proportion of linguistically marked ut-

| Example No. | Speaker   | Original utterance             | English translation        | Target utterance                                                      | Category omitted                                    |
|-------------|-----------|--------------------------------|----------------------------|-----------------------------------------------------------------------|-----------------------------------------------------|
| 1           | Freddy(X) | nein da keiner Messer          | no there no knife          | nein da ist kein Messer (no there is no knife)                        | Verb                                                |
| 2           | Freddy(X) | will Joghurt haben             | want to have yogurt        | ich will Joghurt haben (I want to have yogurt)                        | Subject (pronoun)                                   |
| 3           | Freddy(X) | nach draussen gehen            | go out                     | ich will nach draussen gehen (I want to go out)                       | Subject (pronoun) + Verb (modal)                    |
| 4           | Freddy(I) | da Feuerwehr                   | there fire engine          | da ist eine Feuerwehr (there is a fire engine)                        | Verb + Article                                      |
| 5           | Xinxin    | haben                          | have                       | willst du das haben (do you want that)                                | Subject (pronoun) + Verb (modal) + Object (pronoun) |
| 6           | Xinxin    | Schweine immer ar-beiten       | pigs always to work        | die Schweine muessen immer ar-beiten (the pigs always have to work)   | Article + Verb (auxiliary)                          |
| 7           | CH1       | ist doch hier                  | but is here                | der ist doch hier (but it is there)                                   | Subject (pronoun)                                   |
| 8           | CH3       | immer auf dem Klo              | always on the toilet       | die/der ist immer auf dem Klo (he/she is always on the toilet)        | Subject (pronoun) + Verb                            |
| 9           | CH4       | Kopf                           | head                       | der Kopf (the head)                                                   | Article                                             |
| 10          | CH6       | geb ich mal eben die Hannah ja | I give the Hannah now okay | das geb ich mal eben die Hannah ja (I give it to the Hannah now okay) | Object (pronoun)                                    |

**Table 5.** Examples of incomplete utterances.

terances produced by the child in the two settings was almost identical. The child seemed to have a set pattern of speech at that particular stage of his German development that was not affected by the direct input he received from various interlocutors (reminiscent of the situation when young children have difficulties with pronouncing certain sounds and cannot imitate those sounds even with direct and repeated instruction from adult interlocutors).

The child, like his peers, omitted a larger proportion of one-category than two-category items. Where he differed from his peers was in the order of categories omitted. He had a tendency to omit verbs more than subjects, while his peers omitted subjects more than verbs. The Chinese babysitter omitted subjects and verbs in almost equal proportions. While the child did not speak exactly like the non-native caregiver, his speech also did not fully resemble that of his monolingual peers. Freddy had been a trilingual child up to age two with German as his weakest language. At the time of data collection for this study, he was about to turn three years of age and was in effect a German-English bilingual child. At this point he was stronger in German, the language of his surrounding community, than in English, but he was not yet at the same stage of German proficiency as his daycare peers. Thus, his speech patterns, not surprisingly, did not fully reflect the speech patterns of monolingual German peers, who had had more exposure to German from birth than Freddy, who had been exposed to three languages in his early years. The lack of correlation in the results obtained with this bilingual subject calls into question a simple cause and effect relationship between child-directed speech and the language acquisition process.

In conclusion, we need to be careful when interpreting input studies, usually of monolingual children, as they often report a direct correlation between adult and child speech without exploring the child's speech in different input contexts. Perhaps the correlation is not due to the input received but to the stage of linguistic development already attained by the child, as was found in this study. The child's German language development was proceeding according to a set and possibly idiosyncratic pattern based on his personal linguistic history, rather than to the immediate input he was receiving in interactions with his caregivers. The impact of the speech of non-native caregivers may thus not be of immense linguistic significance as long as children are also exposed to native speakers in their environment.

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<sup>1</sup> This study would not have been possible without the generous support and enthusiasm of Freddy's parents, Freddy, the two babysitters, and the daycare staff and children in Germany. I am very grateful for their time, patience and cooperation. Thanks are also due to the Matsushita International Foundation for financial support and to Anke Stehr for research assistance.

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## MOTIVATIONS AND STRATEGIES FOR CODE-MIXING: THE CASE OF A TRILINGUAL NIGERIAN CHILD

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1. PREAMBLE. Code mixing, in this paper, simply describes the use of vocabulary items from two or three different languages within the same phrase, clause or sentence. This is similar to what Banjo (1983) refers to as 'intra-sentential code-switching' while Redlinger and Park (1980) refer to it as 'language mixing'. The same phenomenon has been described as 'language hybridization' by Leopold (1939-'49) and McLaughlin (1978). Code-mixing is a universal feature of the speech of bilinguals that has attracted several studies. However, it was observed that too much emphasis has been placed on code-mixing in adult speech, thereby relegating children's language mixing to the background. This situation is even more serious in Nigeria, where hundreds of languages co-exist, and this partly motivated the doctoral research from which the issues raised in this paper are extracted. There are several cosmopolitan cities in Nigeria (e.g. Abuja, Ibadan, Jos, Kano, Kaduna, Lagos, etc) where as many as five different languages are in unavoidable daily contact. Many children who grow up in such areas are naturally exposed to these languages from birth. In essence, Nigeria, which is the most populous and linguistically heterogeneous African country, provides a laboratory overflowing with resources for research in language acquisition and learning. But this advantage has not been fully exploited because child language studies are scanty in Nigeria (see also Surakat 2001).

In the study, the subject of the doctoral research was referred to as Baba, his pet name. He was born in Zaria, Nigeria in November 1990, and he is the fourth child of the author's family, having three older sisters. The family lived in a cosmopolitan university environment where English and Hausa are the popular languages. In Nigeria, English is an almost universal Second Language, the official language of politics, administration, journalism, and the medium of instruction in schools. But apart from being the language of instruction in the university, English also serves as the language of interaction among the diverse linguistic and ethnic groups on campus, while Hausa is the language of the immediate community. Baba's parents and sisters use English and Yoruba extensively at home, although occasionally they speak Hausa. In essence, these are the three languages to which Baba was exposed from infancy, and he acquired them simultaneously as a pre-school child. During the period, as observable from the data, Baba's dominant languages were English and Yoruba, but his preferred language was the former (see Surakat 2001 and 2002).

Data collection started in November 1991 and ended in October 1993. A gross total of 5,574 items or tokens (i.e. words, phrases, clauses and sentences) were recorded.

However, only the two-word and telegraphic utterances that appeared in the data between May 1992 and October 1993 were analyzed for code-mixing. Telegraphic utterance here refers to a sentence or construction that contains more than two words. In all, 18% of the data contained instances of substantive code mixing, while cases of pseudo and subsidiary language mixing amounted to 6.5%. Substantive code mixing refers to cases of real language mixing, which Chimombo (1978) labeled genuine code mixing, and it is the focus of this paper. However, there were constructions that contained words from different languages and for which the items are distinctly marked in terms of print type (i.e. Yoruba in *italics*, Hausa in *ITALIC ALL CAPS*, and English in **bold italics**). On the surface, the expressions look like real code mixing, but a close examination would reveal that they lack the features of genuine language mixing. Such constructions have been tagged pseudo/phony, or subsidiary/secondary code mixing, as in **Daddy**, *oya* 'start', **Mum**, *iro* 'wrapper', and so on (see also Surakat 2001:152–55).

All instances of substantive or genuine language mixing were analyzed in terms of rank, structure, and length of utterance (see Surakat 2001 and 2002). Sub-categories of substantive code-mixing identified in the data included:

- i. Code-mixing at the group or phrase rank, e.g. **Water** *yen* 'That water' (noun phrase), **In** *yara* 'In bedroom' (prepositional phrase), and **Stupid** *oyo* 'Stupid rain' (noun phrase);
- ii. Clause rank code-mixing (in Pivot Grammar), e.g. **See** *aago* 'See wrist-watch' (verb + noun), **Bring** *kokoro* 'Bring key' (verb + noun) and **Joko** *here* 'Sit here' (verb + adverb);
- iii. Code-mixing in cleft sentences, e.g. **Sweet** *ni* 'Sweet it-is', **Box** *ni* 'Box it-is' or 'It-is a box', **Eba** *I eat* 'It was eba that I ate', and **Beans** *ni m fe* 'It is beans that I want';
- iv. Code-mixing with Yoruba interrogative particle, e.g. **Kolapo** **drink it ni?** 'Did Kolapo drink it?' and **You too know it ni?** 'Do you know it too?';
- v. Code-mixing with Hausa items, e.g. **Mummy**, **I want to pee FA!** (FA is an emphatic particle), **Daddy seen it BA?** 'Daddy, have you seen it?' (BA is a semi-interrogative element), and **This one is good KO?** (KO is a semi-interrogative particle);
- vi. Code-mixing involving three languages, e.g. **Me** *fe* **AKAMU** **FA!** 'I want pap!' and **Bring** **AKAMU** *kiakia o*, **Mummy** 'Bring pap quickly, Mummy';
- vii. Code-mixing with lexical insertion, e.g. **Mo** *je yam lataaro* 'I ate yam since morning', **Paper** *yi ti faya* 'This paper has torn', **Daddy**, **me too fe beans** 'Daddy, I also want beans' and **She go to buy isana** 'She has gone to buy matches';
- viii. Code-mixing with phrasal insertion, e.g. **Look biro you ni ileele** 'Look at your biro on the floor' and **Rain is falling ni'le wa** 'Rain is falling in our house' or 'Rain is falling on our roof';
- ix. Code-switching between clauses, e.g. **Maa ko'rin I say** 'You should continue singing I say' or 'I say you should continue to sing', **Mo toju e, I cover it very well** 'I kept it, I covered it very well';



- x. Bilingual synonyms and translations, e.g. *O ti tan, it has finish* 'It has finished...' and *Ban mu, give me*.

2. MOTIVATIONS FOR CODE-MIXING. Motivation is used here simply to refer to the sociological, environmental, linguistic and cognitive factors that necessitated, or influenced the production and use of code-mixed utterances by Baba. This is somewhat related to, but not identical with the issue of integrative versus instrumental motivation (see Gardner & Lambert 1972, Gardner 1985, and Cook 2001). From our observations, Baba used language mixing as a technique to overcome production difficulties and for developing bilingual communicative competence (see also Oksa 1976). Like any other child of his age, background and exposure, Baba had a strong desire or integrative motivation to use his languages for meaningful communication, cultural learning and social integration. Consequently, he exploited all available pragmatic, linguistic and cognitive strategies to realize his goals. Before a discussion of these strategies, it is pertinent to consider the various factors that conditioned Baba's production of code-mixing.

2.1. NATURE AND CONTEXT OF LANGUAGE PRESENTATION. A major pragmatic or sociolinguistic determinant of code-mixing in Baba's speech is the context in which the languages were presented to him. During the period of data collection, every member of his family and all his other co-interlocutors were free to use any of the three languages to communicate with Baba. There was no restriction of any sort. With this *laissez faire* approach, Baba's sisters and parents spoke in English, Hausa and Yoruba, or even a mixture of these in their conversations with him. As a result, Baba had no inhibitions about what language to use with members of his family. Naturally, his utterances reflected the various languages and patterns to which he was exposed, including code-mixed constructions (see Appendix C of Volume 1 in Surakat 2001). The *laissez faire* method of language presentation is the exact opposite of the strict, disciplined case study approach in which language presentation to the bilingual child is either person-specific or context-specific (see Ronjat 1913 and Leopold 1939-'49). In a disciplined case study, for instance, the mother would strictly use one language while the father would use another to communicate with the child. The result often reported in studies of this type is that the incidence of language mixing is either completely eliminated or drastically reduced (see McLaughlin 1978: 92 ff, Redlinger & Park 1980: 340 ff., and Oladejo 1989:47).

2.2. PROFILE OF CO-INTERLOCUTORS. Another significant pragmatic determinant of language mixing in Baba's speech is the profile of his co-interlocutors (i.e. their linguistic background as bilinguals, their levels of proficiency in the languages, their preferred languages, etc). Virtually all of Baba's co-interlocutors, as observable from the data, are his siblings and parents. They are familiar people who share a common trilingual background. Consequently, Baba used both mixed and unmixed utterances

to communicate his intentions, since he was sure of being understood (see also McClure 1977:102 ff., McLaughlin 1978, Sridhar & Sridhar 1980:2).

The few occasions (documented in the audio and video recordings) when Baba encountered strangers or unfamiliar people, he either kept mute or communicated with them only in English. In one particular case, Baba used English with Andy (the researcher's colleague), having assessed Andy as non-Yoruba. Baba had never met Andy before this occasion. It was observed that Baba used code-mixed utterances with his father and immediate elder sister shortly before they met Andy. And almost immediately after the conversation with Andy, instances of code-mixing were observed again in Baba's speech (see also VTR 405–407, 503; ATR 2475–2479, 2471 and 2486 in Volume 2 of Surakat 2001). This suggests that Baba was motivated or conditioned to use code-mixing when in the company of familiar people with whom he shared the same languages, *ceteris paribus* (see also McClure 1977:103).

2.3. TOPIC OF DISCUSSION AND LANGUAGE GAP. Apart from the nature of language presentation, and conversational partners, another factor that greatly influenced or necessitated code-mixing in Baba's speech is the subject matter or field of discourse. When the discussion is about certain food items and toys for which he has no translation equivalents, Baba tended to borrow words from other languages in order to fill the gap. Lexical insertions involving food items included 'bread' as in *Mo je bread mi tan* 'I have finished eating my bread' and *Bread ni m fe* 'It is bread that I want'; 'eba' as in *Eba I eat* 'It was eba that I ate'. Other food items borrowed were 'sugar', 'sweet', 'rice', 'tea', 'mango'; while toys included 'ball', 'truck/motor', 'biro', 'radio' and so on (see Appendix A of Volume 1, Surakat 2001). For all the borrowed items mentioned here, it is necessary to state that Yoruba language does not have equivalent words. By implication, there is language gap, which may serve as an explanation for the observed code mixing.

2.4. STYLISTIC MOTIVATIONS FOR CODE-MIXING. There were instances of lexical insertions that could not be attributed to language gap. Some items that have translation equivalents still occurred in Baba's code-mixed utterances. Language mixing in some of these cases might have been influenced by stylistic considerations such as the need to emphasize or stress a point, the need for clarification or elaboration, and the necessity for focusing or topicalization. For example, code-mixing was used to stress the points in utterances where clauses of one language ended with emphatic or completive particles taken from another language. Examples are the use of Hausa clause-final emphatic particle 'FA', and the Yoruba clause-final completive as in *Me too pee FA* and *I am tired o* respectively. Code-mixing for topicalization or thematization can be illustrated with examples such as *Eba I eat*, *Beans ni m fe*, *Box ni* and so on. Language mixing appeared to have been used stylistically to clarify a point or to resolve potential ambiguity or even for elaboration through the use of bilingual synonyms or translations within the same phrase, clause or sentence. Examples include *Sibi*, *spoon*, *Thief*, *BARAWO*, *O ti tan*, *it has finish* and *Ban mu*, *give me* (see also McClure 1977:107).

2.5. COGNITIVE FACTORS. From the psycholinguistic or cognitive perspective, three factors seem to have necessitated code-mixing in Baba's speech. These are i) complexity of language processing, ii) saliency, and iii) language deficit (see Surakat 2001). Relative ease or complexity of language processing is crucial, because some words are easier to pronounce than others, just as simple syntactic patterns are easier to process than more complex ones. The degree of complexity of linguistic units has bearing on the kinds of phonemes, words and sentences that the bilingual child can easily process for spontaneous use. This may explain why *fe*, a Yoruba verb is preferred to its English equivalent 'want' in several contexts observed in the data. *Fe*, which has the consonant + vowel (CV) phonological structure, is easier to articulate when compared with its English equivalent 'want', which has a CVCC pattern. It requires more articulatory and processing efforts to produce consonant clusters. Even among native English-speaking children, consonant clusters are acquired later than single consonants. Another example is the preference for *dodo* over '(fried) plantain'. The principle of derivational complexity or the simplicity principle (see Atkinson et al, 1982:304 ff) may also explain the use of code-mixing in interrogative constructions such as *Kolapo drink it ni?* or *You see mango ni?*. The English-only equivalents 'Did Kolapo drink it?' and 'Did you see a mango?' require an interrogative structure that is cognitively and syntactically more complex (see also Ndahi 1982 and Surakat 2001).

3. STRATEGIES FOR CODE-MIXING. According to Brown (1980:83) a strategy is 'a particular method of approaching a problem or a task, a mode of operation for achieving a particular end, a planned design for controlling and manipulating certain information'. Strategies can be used for language comprehension or production by language acquirers or learners. Communication strategies can be linguistic or non-linguistic, pragmatic or cognitive (see also Færch & Kasper 1983 and Cook 2001). Some of the production strategies employed by Baba to achieve his communication goals are discussed below, particularly as they relate to the phenomenon of code mixing.

3.1. IMITATION AND SPEECH MODELLING. Baba seemed to have learnt how to imitate the various linguistic patterns to which he was exposed, including language mixing. He mimicked his parents and sisters, a kind of speech modelling, which culminated in his spontaneous use of code-mixed utterances. He also used code-mixing in prefabricated patterns or whole phrases, which he must have learnt by rote. It was observed that Baba's code-mixed utterances reflected some of the patterns used by his parents and sisters (see Appendix C, Volume 1 of Surakat, 2001). This strategy seems to tally with some postulations by behaviourists who emphasized the role played by imitation, practice and reinforcement in language acquisition as well as in language learning.

3.2. CREATIVE CONSTRUCTIONS. Baba creatively produced several code-mixed patterns that he could not have heard from his models (i.e. parents and sisters). From the viewpoints of rationalism and cognitivism, Baba formulated and tested hypotheses based on the linguistic data available to him. In the process, he produced certain

code-mixed utterances that are more or less peculiar to him. Several examples were observed in the data, e.g. *Rain ni'ta* 'Rain..outside', *Sibi too* 'Spoon too', *Take hun kan* 'Take one sweet', *Bring iyen bread* 'Bring that bread', *See eyo kan bread nylon yen* 'See one bread ... that nylon', *Me lo too* 'I want to use drug too', *O wa n be store* 'It is there inside store', *Bring owo buy GYEDA PAPIYA* 'Bring money to buy groundnut', *I am tired ni* 'I am just tired', *N pa radio* 'I stop the radio', *I say that the bread sweet, nkan ti me said niyen* '... that is what I said', *Sokoto you n'ta FA!* 'Your trousers outside!', *Nigbati us wa nbe, Bola told me* 'When we were there ...', *See awon aja* 'See dogs', *See awon these things* (awon in the last two examples indicates 'plural'), and *I can sing my oruko* 'I can sing my name'. It is doubtful if Baba ever heard any of these constructions spoken.

3.3. SIMPLIFICATION. The simplicity principle (mentioned in section 2.5) explains why in terms of pronunciation, short and simple phonological structures are preferred to long and complex ones, even if it means resorting to code-mixing. This principle also applied at the level of vocabulary, morphology and syntax. In general terms, the absence of morphological inflections (e.g. for verbs, nouns and adjectives) is a reflection of the simplification strategy common with children learning or acquiring language. Several examples were observed from the data (see Surakat 2001 and Corder 1983). Baba generally preferred simplification to either circumlocution or word-coinage, which are also popular production strategies among bilinguals, particularly within the context of second language learning or acquisition (see Cook 2001:107).

3.4. TRANSLATION. There were several instances in the data that illustrate Baba's use of translations or bilingual synonyms in order to elaborate or clarify a point. Examples include *Sibi, spoon, Thief, BARAWO, O ti tan, it has finish...*, and *Ba n muu*, and *give me* (see Surakat 2001, volumes 1 and 2)

3.5. TRANSFERENCE. Apart from the transference of Yoruba syntactic patterns into English even in code-mixed utterances, there were also instances of lexical transference or borrowing from one language to the other. This is often the case when there is either language deficit or language gap. Whereas language gap means that an item in one language does not have an equivalent in the other language, language deficit describes a situation where the child knows a lexical item or construction in one language but does not know its equivalent in the other language(s). Lexical transference may also be a reflection of the AVOIDANCE strategy. If the child was not sure of a word in one language, he avoided it and used a suitable equivalent from the other language, thus resulting in language mixing. The examples of code-mixing given in section 2.3 above also exemplify transference and avoidance strategies.

4. CONCLUSION. Bilingualism is a global phenomenon because of societal conditions and the fact that the ability to speak two or more languages is an asset in the modern world. There are more bilinguals today than monolinguals. Knowing a second

language is a normal part of human existence (Cook 2001:159). And where there are bilinguals (with varying degrees of proficiency in the various languages), code switching (whether inter- or intra-sentential) is a normal occurrence. In other words, code-mixing is a natural feature of the speech of a bilingual, and it is conditioned or determined by a network of sociolinguistic, psycholinguistic and other factors. Unlike those who perceive code-mixing as a problem in second language learning (e.g. Ogunremi 1992), language mixing can be applied positively to achieve results in second language teaching (see Cook 2001). From our investigations, code-mixing is a useful tool for solving communication problems during interaction. It is an invaluable strategy for developing bilingual communicative competence (see also Oksaar 1976, Tay 1988, and Treffers-Daller 1994). Consequently, there is a need to conduct more research on the various ramifications of code-mixing by bilingual children. Such studies would, among other things, provide useful insights for applied linguists, particularly for language teaching and language learning.

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## FORMAL AND FUNCTIONAL ACCOUNTS OF CLITIC PHENOMENA

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THIS PAPER represents a further attempt to shed light on the subject of clitic systems<sup>1</sup>. It is the sequel that was promised in endnote 9 of Bennett (2002). That paper concentrates on an on-going change in Polish, where a second-position (2P) clitic system has gradually been giving way to a verb-clitic system. In the process it summarizes an analysis within the framework of generative grammar (GG) of a similar change in Bulgarian (cf. Franks & King 2000:318), but concludes that a parallel analysis of Polish would be unsatisfactory. The paper mentioned Optimality Theory (OT) and Relational Network Grammar (RNG) as alternative theoretical frameworks, and the intention was that the sequel would contrast GG, OT and RNG formalizations of the same Polish data. In the meantime, however, it has become clear to me that my understanding of the Polish data was defective in certain respects. This issue is therefore taken up in section 3 below. Section 4 then discusses a selection of analyses of clitic phenomena within the three frameworks, and section 5 presents a brief summary. As a preliminary, though, it is appropriate to comment on the distinction between 'formal' and 'functional' linguistics (see section 1), and the relevance of diachronic data (section 2).

1. FORMAL AND FUNCTIONAL LINGUISTICS. According to one view of the difference between formal and functional linguistics (Lapolla 1990:5), '[they] are two very different endeavors... [they] have different goals, methods, data, and applications, and should not be confused'. An alternative view, which is preferred here, is that it is feasible and desirable to reconcile the two approaches. Functional analyses are often lacking in explicitness and precision, and can benefit from being formalized. Formal analyses, in turn, can benefit from a widening of their scope to include semantic and discourse considerations as well as syntactic, morphological and phonological data. It is helpful, in addition (cf. Lamb 1999:276–77), to be well aware of the difference between formalization, on the one hand, and the issue of linguistic form (or structure) vs. function, on the other. With regard to the latter issue, GG has tended to neglect function; or, at least, its conception of function is not one that a functionalist would find convincing. To take a specific example, consider a typical Government & Binding (GB) theory analysis of a sentence such as *The oak table has been sold*. In the 'derivation' of this sentence, the NP *the oak table* 'moves' from its 'underlying' position immediately following the (passive) verb *has been sold* to the previously empty subject NP position, and the reason it moves is that, in the adopted formalization, NPs have to be marked for case but a passive verb cannot assign case to a follow-

ing NP; so the NP moves 'in order to acquire case'. A functionalist would typically offer a discourse-oriented analysis of this example, to the effect that *the oak table* occurs at the beginning of the clause because it is the 'theme' (whereas *has been sold* is the 'rheme'). The use of a passive rather than an active verb signals the fact that the theme is the 'patient' (or 'affected participant') of *sell* rather than its 'agent'. (The agent role is unrepresented in this clause because the identity of the seller of the table is either unknown or of no concern to the speaker.) Within Systemic Functional Linguistics (SFL), clauses are described, informally, as having three simultaneous constituent structures, which are mapped onto one another—one (the 'thematic' structure) involving the clause as 'message' and featuring the notion 'theme', one (the 'interpersonal' structure) involving an 'exchange' between speaker and listener, and one (the 'experiential' or 'ideational' structure) involving the 'representation' of some situation (Halliday 1994:33–34). However, no formalization is proposed in SFL for mapping these structures onto one another.

OT has been described as 'the single most important development in generative grammar in the 1990s', and as involving a shift 'from a rule-based to an output-based model' (Boersma et al. 2000:1). It employs a rather different formalization from earlier versions of GG, and an important role is played in OT by the notion of competition between different constraints. From the point of view of functionalism, OT continues GG's neglect of function.

RNG embraced discourse structure even in its earlier stratificational grammar (SG) incarnation and aimed therefore to pay adequate attention to function as well as linguistic form. In addition, while GG insisted that there needed to be an adequate characterization of linguistic 'competence' in existence before it was appropriate to embark on a study of 'performance', SG was concerned from the outset with the *use* of language and the separate processes of producing and understanding speech. It employed a formalism consisting of signals traveling through the network of a grammar. Dell and Reich (1980) describe a RNG computer-simulation of slips of the tongue. Their model crucially involves allowing a proportion of the activation at a given node to spread to neighboring nodes, and also the notion of competition, i.e. at places in a network at which a choice is available, the candidate with the highest level of activation wins out. The model was able to replicate the kinds of errors attested in human speakers and also suggested a number of testable predictions. More recently, the neurocognitive grammar (NCG) version of RNG has added a requirement of 'neurological plausibility': 'A successful theory has to be compatible with what is known about the brain from neurology and cognitive neuroscience' (Lamb 1999:293). Reich and Richards (2004) and Richards (2004) propose a further computer-simulation of RNG, which sets out to incorporate various features of Lamb's (1999) work.

Sullivan (2001) compares OT and RNG analyses of certain Korean consonantal alternations, starting from the OT analysis of Gavrin (1999). He considers the specific OT constraints proposed by Gavrin, and also their ranking, and argues that they both 'emerge from a generalized RN description that is focused on more fundamental linguistic considerations, e.g., syllable and morphological structure' (2001:323).

He argues, further, that the OT constraints and their ranking are both ‘unexplained “facts” or theoretical postulates’ of OT, whereas ‘the postulates underlying RN theory are at a much more fundamental level’ (2001:323). He therefore concludes that ‘OT is actually derivable as a theorem or set of theorems of a fully-developed RN theory’ (2001:323). I am not aware of any OT reply to these claims. In any case, though, the OT analysis outlined in section 4 will be discussed from my own point of view, and I shall treat GG, OT and RNG as separate theoretical frameworks rather than aligning OT with one of the other two.

A further preliminary point that is rather obvious but needs to be made is that, whichever kind of approach one adopts, one is limited by the available linguistic evidence; a particular analysis that seems satisfactory for certain data may well no longer be satisfactory once additional data are taken into account. Moreover, if the validity of one’s informal account of a set of data is suspect, there would seem to be little point in proposing any sort of formalization of the data.

2. SYNCHRONIC AND DIACHRONIC LINGUISTICS. The standard Saussurean position on the synchrony-diachrony distinction is that synchrony has logical priority over diachrony, since synchronic descriptions need to be available for the earlier and later points in time before it is feasible to embark on a diachronic description. However, given that there always seem to be several ways of formalizing the same synchronic data—not least because of the existence of competing theories of language—an alternative view is that consideration of (previous or subsequent) diachronic developments constitutes additional evidence that can be used in choosing between the alternative synchronic formalizations. According to this view the synchronic and diachronic orientations are mutually interdependent rather than that either has logical priority over the other. With regard to clitics, the way clitic systems change over time can suggest how they should be analysed at a particular point in time. There are admittedly interesting questions that can be asked about clitics from an essentially synchronic point of view. However, ‘since clitics represent an intermediate stage between independent words and affixes, they cry out to be treated diachronically’ (Bennett 2002:173). Accordingly, many of the questions that need to be asked about clitics have a diachronic orientation. They include the following:

- (1) As regards 2P clitics, why is it that the 2C structure (clitics after the first constituent) represents a later stage historically than the 2W structure (clitics after the first word)?
- (2) How does the change from 2W to 2C take place?
- (3) Why do verb-clitic systems represent a later stage historically than 2P systems?
- (4) How does the change from a 2P system to a verb-clitic system take place?

3. DIACHRONIC EVIDENCE FROM POLISH. Bennett (2002:181) reported the findings of Rittel (1975) and Andersen (1987) that over the last 500 years Polish has been

undergoing a change from a 2P system to a verb-clitic system, and the further stage at which its auxiliary verb clitics have become inflections. Polish is thus highly relevant to questions (3) and (4) of the previous section. Bennett's own analysis of a modern Polish text (2002:182–83) confirmed the findings of Rittel and Andersen that the word order of subordinate clauses is more conservative and exhibits a greater proportion of 2P clitics than main clauses. It also revealed that, in the text in question, all main-clause occurrences of the past-tense auxiliaries, the reflexive pronoun *się*, and the dative pronominal clitics were attached to the main verb, whereas the accusative pronominal clitics occurred sometimes at 2P and sometimes attached to the main verb. Elaborating on the views of Delbrück (1900), Bennett suggested (2002:179–80, 185) that Polish has been changing from a discourse-oriented system in which its clitics occurred near the beginning of a clause, because they were thematic in Halliday's sense, to a semantically-oriented system in which clitics are attached to the constituent to which they are most closely related semantically, i.e. the verb. It was assumed that individual clitics were subject to two different pressures and that change from the one type of system to the other depended on a gradual shift in the magnitude of the two pressures over time. The main defect of this account, as pointed out to me by Janez Orešnik (p.c.), is that it offers no explanation of the fact that the reverse shift, from semantically-oriented to discourse-oriented, apparently does not occur. The earlier formulation thus ignored question (3) of the previous section. As with the vast majority of cases of 'grammaticalization', we are dealing here with a unidirectional change. Moreover, the last part of the change—from verb-clitic to verb-affix—is certainly frequently referred to as a case of grammaticalization. This issue of unidirectionality is taken up again in section 4.3.

#### 4. (PARTIAL) FORMALIZATIONS OF CLITIC PHENOMENA.

4.1. GENERATIVE ANALYSES. We shall consider a phonological analysis (4.1.1), a combined syntactic-and-phonological analysis (4.1.2), and a syntactic analysis (4.1.3). In each case Serbo-Croatian (S-Cr) data are discussed. Section 4.1.4 then provides discussion of the three analyses, followed in section 4.1.5 by a summary and discussion of Franks and King's (2000:318) 'diachronic scenario'.

4.1.1. A PHONOLOGICAL ANALYSIS. Radanović-Kocić (1996) describes her approach to the S-Cr clitics as 'prosodic'. It operates crucially with the higher-level phonological units 'intonational phrase' (IntP) and 'phonological phrase' (PhonP)<sup>2</sup>. She regards the cliticized forms of object pronouns and auxiliary verbs as occupying the same syntactic positions as their full form counterparts—'at the syntactic level it is totally irrelevant whether something is marked as [+clitic] or not... this feature starts to play a role only at the prosodic level' (1996:433). The feature [+clitic] is assigned to all the items in question except where they need to carry stress, e.g., when conjoined with another similar item or when contrastive. The 'clitic movement rule', formulated as in (5), then applies; and examples (6)–(7) show the outcome of this rule<sup>3</sup>.

- (5) Move all '+clitic' elements within an [IntP] into the position after the first [PhonP] of the same [IntP].
- (6) a. *Ja sam ti obećala igračku* [S-Cr]  
 I aux.past to-you promised toy  
 'I promised you a toy.'
- b. *Ja, tvoja mama, obećala sam ti igračku* [S-Cr]  
 I your Mom promised aux.past to-you toy  
 'I, your Mom, promised you a toy.'
- (7) *Svoje probleme i dileme lingvistika će rešavati* [S-Cr]  
 its problems and dilemmas linguistics aux.future solve  
 'Linguistics will solve its problems and dilemmas.'

The one-word subject of sentences such as (6)a 'obligatorily belongs to the same [IntP] as the rest of its clause' (1996:441), and the clitics are therefore attached to the pronoun *ja* 'I', which counts as the first PhonP within the IntP. In (6)b, on the other hand, the appositional phrase *tvoja mama* 'your Mom' is said as a separate IntP and the clitics are attached to the first PhonP of the following IntP, i.e. *obećala* 'promised'. Example (7) begins with a complex NP functioning as the object of the verb, and this also constitutes a separate IntP, with the result that the clitic *će* 'will' is attached to the first PhonP of the IntP representing the remainder of the clause, i.e. *lingvistika* 'linguistics'.

Radanović-Kocić's main argument against a syntactic treatment, and for a phonological treatment, is that it is problematic for syntactic analyses 'that an obvious phonological feature (being stressless) affects ordering, i.e. syntactic behavior of clitics' (1996:429). She continues: 'If we assume that clitics are defined in purely phonological terms, then their placement can also be accounted for at the prosodic level, [as] an adjustment in the intonational pattern of an utterance as a whole' (1996:429). Other writers (e.g. Anderson 2000:308) cite examples such as (8) as further evidence against syntactic analyses, since they appear to demonstrate that a S-Cr clitic may be positioned after material that does not constitute a syntactically motivated constituent of its clause:

- (8) *Moja će mlađa sestra doći u utorak* [S-Cr]  
 my aux.future younger sister come on Tuesday  
 'My younger sister will come on Tuesday.'

Radanović-Kocić herself places no emphasis on this kind of evidence in view of the fact that her own dialect of S-Cr makes very limited use of such structures.

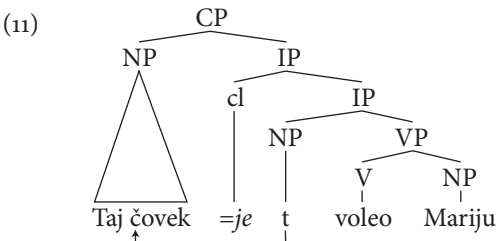
As for whether the prosodic units that Radanović-Kocić invokes really are phonological rather than syntactic units, Hock (1996:201) reports that, at the Workshop at which her paper and his own were presented, many of the syntacticians present assumed that the units in question were at least also syntactic units. Hock's own view is that they differ significantly from syntactic units as a result of 'rebracketing'. (Within

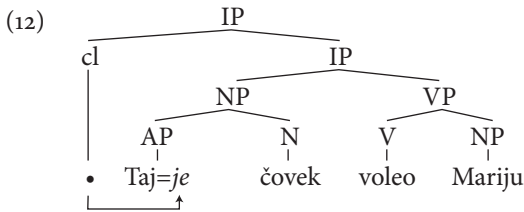
the framework of SFL the units in question would be the product of the ‘information structure’ subcomponent of the part of the grammar that is concerned with the creation of texts, or discourse (Halliday 1994:292–307).)

4.1.2. A COMBINED SYNTACTIC AND PHONOLOGICAL ANALYSIS. Halpern’s (1995) analysis of 2P clitic placement in S-Cr treats 2C examples such as (9) mainly within the syntax. On the other hand, 2W examples such as (10) receive an analysis that is partly syntactic and partly phonological<sup>4</sup>.

- (9) Taj čovek je voleo Mariju [S-Cr]  
 that man aux.past loved Maria  
 ‘That man loved Maria.’
- (10) Taj je čovek voleo Mariju [S-Cr]  
 that aux.past man loved Maria  
 ‘That man loved Maria.’

Halpern’s tree diagrams for (9) and (10) are presented in (11) and (12), respectively. In either type of example clitics are (syntactically) left-adjoined to an IP (INFL Phrase, i.e. in older terminology, a sentence)—though he admits that he is glossing over whether clitics are ‘base-generated’ in that position or ‘copied’ there or ‘moved’ there (Halpern 1995:18)<sup>5</sup>. The analysis proposed for (9)—i.e. (11)—entails claiming that the subject of the sentence is ‘fronted’ out of the constituent to which the clitic is attached, to a position above the clitic, i.e. that it has been ‘topicalized’. As a result, the clitic *je*—which is specifically an enclitic—is now no longer stranded at the front of the sentence with no stressed word to its left to attach to. A parallel analysis for (10) is not available, since *taj* ‘that’ is not a clause-constituent according to Halpern and cannot therefore be fronted: ‘The problem with a purely syntactic approach to clitic placement is that 2W is not well-defined syntactically, and rather should be defined in terms of prosodic constituents’ (1995:44). (This point is disputed, however, by Progovac; see 4.1.3.) Instead, therefore, Halpern posits a (last resort) phonological operation of ‘Prosodic Inversion’, which allows the clitic to attach to the end of the first stressed word to its right. The advantage that Halpern claims for his analysis is that ‘this separation of the problem into two parts permits simpler theories of the parts, and a more complete but constrained theory of clitic placement than a theory which treats clitic placement entirely as a matter of syntax... or... as entirely extra-syntactic’ (1995:44).





Halpern contrasts the acceptable example (10) with (13), which he marks as unacceptable:

- (13) \**Prijatelji su moje sestre upravo stigli* [S-Cr]  
 friends aux.past my sister just arrived  
 'My sister's friends have just arrived.'

Not all complex constituents allow the insertion of clitics after the first word. Thus while constituents such as *taj čovek* 'that man' in (10) are interruptible, *prijatelji moje sestre* 'friends of my sister' is described as a 'fortress', i.e. it is impregnable in the sense of being uninterruptible. Halpern regards this issue as a prosodic rather than a syntactic matter, and suggests that the problem is that the clitic and the first word of the fortress are contained in different phonological phrases (1995:74).

4.1.3. A SYNTACTIC ANALYSIS. The feature of Halpern's (1995) analysis that he regards as its greatest strength—the separation of the problem of clitic placement into a syntactic part and a prosodic part, which permits simple theories of each part—is regarded by Progovac (1996) as its main defect. As she puts it, Halpern's analysis posits two separate clitic positions, 2C and 2W, whereas her own analysis posits only one: 'we can... dispense with the view that there are two distinct clitic positions in SC. All other things being equal, a unitary explanation of a single phenomenon should be preferred over a disjunctive one' (Progovac 1996:415). Her analysis involves treating S-Cr clitics as being right-adjoined to Comp, and the problem of a clitic being stranded, and therefore unpronounceable, at the beginning of a sentence is solved in the same way for (9) and (10): the material that appears to the left of the clitic moves from its original position to Spec of CP. As for whether *taj* 'that' in (10) is a clause-constituent, Progovac claims that material that can be separated from the head of a phrase by clitics can also in general be separated by non-clitic constituents (1996:414–15)—cf. (14)–(16):

- (14) *Anina im sestra nudi čokoladu* [S-Cr]  
 Ana's to-them sister offers chocolate  
 'Ana's sister offers them chocolate.'
- (15) *Anina dolazi sestra* [S-Cr]  
 Ana's comes sister  
 'Ana's sister is coming.'

- (16) Čija dolazi sestra? [S-Cr]  
 whose comes sister  
 'Whose sister is coming?'

She argues therefore that *taj* in examples such as (10) is indeed a clause constituent, contrary to the claims of, e.g., Halpern (1995:44) and Anderson (2000:308). As for fortresses, Progovac rejects prosodic accounts—on the grounds that, since a noun such as *prijatelji* 'friends' in (13) is obviously a stress-bearer, there is no phonological reason for the sentence to be ungrammatical (1996:418). What matters, she claims, is that any syntactic material that can move to Spec of CP can host clitics, and in this instance the movement in question is not possible. Finally, with examples such as (17), she raises the further problem for prosodic analyses that the complementizer *da* 'that' is typically not stressed—how, therefore, can it be claimed that the S-Cr clitics need to be attached to a preceding stressed word?

- (17) Stefan tvrđi da *mu* *ga* *je* Petar poklonio [S-Cr]  
 Stefan claims that to-him it aux.past Peter presented  
 'Stefan claims that Peter gave it to him as a present.'

4.1.4. DISCUSSION OF THE ABOVE THREE GENERATIVE ANALYSES. Although the analyses of 4.1.1–4.1.3 were labeled phonological, syntactic and phonological, and syntactic, respectively, all three involve both syntax and phonology to some degree. Thus while, for Radanović-Kocić, clitics crucially occupy a position within an IntP, they are also part of the structure of a clause. Similarly, Progovac acknowledges that clitics are generally phonologically dependent and need to be attached to a host. However, none of the three provides a fully explicit account of all the relevant syntactic and phonological facts; there are unsubstantiated claims in all three. The analyses are therefore only partially formalized, and it is impossible to choose between them on any objective basis. One common property, though, is that they all invoke the notion of movement—whether in the syntax (Progovac), or the phonology (Radanović-Kocić), or both (Halpern)—which we have called into question from a functionalist point of view. Functionalists typically baulk even at the term 'topicalized' (as in Halpern's analysis of [9]—cf. [11]) despite the familiarity of the concept 'topic' in accounts of discourse structure, since it implies that at some earlier stage of the 'derivation' the constituent in question has not yet 'become' the topic. A further feature that unites the three analyses is that they are all intended as synchronic analyses of S-Cr. It is to be expected therefore that they have no obvious diachronic applications. We turn now to a generative analysis that is specifically diachronic.

4.1.5. FRANKS AND KING'S 'DIACHRONIC SCENARIO'. In the course of the development of 'Older Bulgarian' into the present-day language, its clitics underwent a change from a 2P system to one in which the clitics are adjacent to the verb. Franks and King's (2000:318) diachronic scenario for this language treats the change as triggered



by its loss of case and the rise of articles<sup>6</sup>. Since Polish has neither lost its category of case nor developed articles, the analysis is not applicable to the otherwise similar ongoing change of Polish, whatever its merits may be as an analysis of Bulgarian.

#### 4.2. OPTIMALITY THEORY.

4.2.1. AN OT ANALYSIS. Anderson (2000:305–06) regards the positional possibilities for clitics as ‘strikingly analogous to those for affixes inside words’. He also draws attention to parallels between the irregularities typically found in clitic systems and allomorphy within word structure (ibid 314–15). (A relevant example for S-Cr clitics is provided by the accusative of the 3rd sing. fem. pronominal clitic, which is realized as *ju* if the cluster in question also contains the 3rd sing. auxiliary clitic *je*, but is otherwise itself realized as *je*.) In consequence of such facts, rather than considering clitic placement to be a syntactic matter, he prefers to regard it as involving the morphology of phrases (ibid 306, 313–14). In addition, he regards the relative order of particular clitics as depending on a set of element-specific constraints of the kind invoked within the framework of OT.

Anderson presents a fairly informal account of how OT could be applied to S-Cr. The general idea is that all the clitics present in some domain, e.g. the clause, would be unordered on their introduction; the order in which they are placed would depend on the ranking of the various constraints which apply to them. These would to some extent consist of constraints relating to individual clitics, but would also involve more general constraints. The situation may be clarified with two rather simplified examples:

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| (18) a. INTEGRITY (Word)          | (19) a. INTEGRITY (Word)          |
| b. NON-INITIAL (Clitic)           | b. NON-INITIAL (Clitic)           |
| c. INTEGRITY (N+G)                | c. INTEGRITY (XP)                 |
| d. EDGEMOST (Q <sub>cl</sub> L)   | d. EDGEMOST (Q <sub>cl</sub> L)   |
| e. EDGEMOST (aux <sub>cl</sub> L) | e. EDGEMOST (aux <sub>cl</sub> L) |
| f. :                              | f. :                              |
| g. INTEGRITY (A+N)                |                                   |

In each example, (18) and (19), we have a small set of constraints ranked from the top down. The EDGEMOST constraints in (d) and (e) indicate that the (yes-no) Q(uestion) clitic, i.e. S-Cr *li*, and the various clitic auxiliaries should appear at the L(ef) edge of their domain, and the fact that (d) is ranked above (e) specifies that Q appears further to the left of its domain than any of the auxiliaries. However, there is also a higher-ranking constraint, in line (b) in each example, to the effect that all of the clitics have to be NON-INITIAL, i.e. preceded by something else. When combined with constraints such as (d) and (e), constraint (b) has the effect of stating that the clitics have to be in second position. The highest of the constraints shown, in (18)a and (19)a, means that a word may not be interrupted (Anderson 2000:320). In the present context, this would prevent the clitics from being preceded by part of a word. Example (19) also has a similar constraint, at (c), preventing any kind of phrase from being interrupted;

(19) would therefore correspond to a language such as Czech or Slovenian in which 2P clitics always occur at 2C, or any dialect of S-Cr that disallows 2W. In (18) the constraint INTEGRITY (XP) is replaced by two specific instances, at (c) and (g). Constraint (c) relates to phrases consisting of a noun followed by a genitive expression, e.g., *prijatelji moje sestre* 'friends of my sister' in (13). Constraint (g), on the other hand, relates to phrases consisting of an adjective followed by a noun (where *adjective* covers any pre-modifier, including a determiner), e.g. *taj čovek* 'that man' in (10). Example (18) would correspond, therefore, to a dialect of S-Cr in which the EDMOST constraints for clitics would take precedence over the integrity of A+N phrases but not over the higher-ranking integrity constraint for N+G phrases<sup>7</sup>.

4.2.2. DISCUSSION OF THE OT ANALYSIS. Since differences between dialects and languages may be characterized in terms of different orderings of OT constraints, the mechanism of reordering can be invoked to characterize a particular linguistic change. However, it seems reasonable to suggest that comparison of the two grammars in question would amount merely to stating what the change is that has taken place, rather than explaining how it has taken place. More generally, with regard to individual constraints such as the various EDMOST constraints, a functionalist would like to be told why particular items obey the constraints rather than simply that they do.

4.3. RELATIONAL NETWORK GRAMMAR<sup>8</sup>. As was pointed out in section 3, Bennett suggested (2002:179–80, 185) that clitics which are in the process of changing from 2P placement to the position adjacent to the verb are subject to two different pressures, and that the magnitude of the two pressures changes over time. With regard to the reflexive pronoun clitic of Old Church Slavic and Old Russian, he assumed (2000:180) that the pressure to occur adjacent to the verb frequently outweighed the pressure for it to congregate with other informationally and phonologically non-prominent items near the beginning of a clause. Thus he assumed that we are dealing with a case of competition between two possibilities, with the stronger one winning out. This situation brings to mind Dell and Reich's (1980) computer-simulation of slips of the tongue. To take a simple example, in attempting to pronounce the 'word string' *bop deck*, it could happen that, at the point where /d/ needed to be pronounced, /b/ was still receiving some degree of activation; and it could even happen that the level of activation of the /b/ would be higher than that of the /d/—in which case the computer would 'pronounce' the perseveration error *bop beck* instead of *bop deck*. The likelihood of this happening in the simulation was related to the frequency with which the /b/ node had been used immediately before (1980:26–28). The competition here involves the fairly straightforward situation where two phonemes are competing to occur in the same slot. By contrast, the clitics example seemed to involve two different slots competing for the same item, which appeared rather more difficult to formalize in the RNG framework. The proposal that was being considered would have entailed tackling the broader issue of mapping SFL's three simultaneous constituent

structures onto one another (cf. section 1). Assuming that clitics occur in one place in the experiential structure, which is semantically-oriented, and in another place in the thematic structure, which is of course discourse-oriented, the mechanism for mapping the structures onto each other would determine the position of a clitic according to the strength of its associations in the two structures.

It will be recalled, however, that there is a major problem with our earlier conception of the diachronic change in question (see section 3). Over time one would expect that the strengths of association could change either way, i.e., not only that a discourse-oriented system could gradually be replaced by a semantically-oriented system but also that a semantically-oriented system could gradually give way to a discourse-oriented system. On the basis at least of the Slavic and the Romance languages, this latter possibility seems not to occur. It is appropriate therefore to look for some alternative understanding, and formalization, of the facts.

It is to be found in Lamb's (1999) conception of lexicalization. Even though a word such as *happiness* can be understood on the basis of the meanings of its constituent morphemes, the frequency with which this combination occurs is such that the lexicon of the typical speaker will contain not just the separate lexemes *happy* and *ness* but also a complex lexeme *happiness*. As Lamb puts it (1999:165): 'it is repeated use rather than degree of idiomaticity that determines presence or absence of a higher-level lexical nection'. Elsewhere he writes (1999:271): 'any two things that consistently occur together are likely to become associated'. Moreover, the more frequently any part of the linguistic network (or wider cognitive network) is used, the easier it is to use it again: 'The pathways of the brain are like pathways through a meadow or field or jungle—the more they are used the easier they become to use again' (1999:179). In formalizing this phenomenon in NCG, lines of different strengths are used (e.g. they are drawn with different widths) and it is assumed that the strengths of the lines corresponding to frequently used items will increase over time. A further relevant point is that the existence of a complex lexeme does not mean that the item in question can only be processed as a single unit. It is quite possible that the information in question is redundantly represented and reflects different analyses simultaneously within the same cognitive system (1999:233). Even in the case of idiomatic complex lexemes such as *spill the beans* 'divulge information that should have been kept secret', where one might suppose that the literal meaning of the expression would not register at all, there may be some activation of the meaning of *spill* (cf. Lamb 1999:184, where a similar point is made about *hot* as in *hot dog*).

I suggest that such ideas provide the basis for explaining the change of a 2P clitic system to a verb-clitic system—though it will require a considerable amount of work to flesh out all the details. Here I will attempt merely to give a broad outline.

In a 2P clitic language such as S-Cr, a wide variety of constituents can occur in first position in a sentence, including the subject NP, an object NP, any kind of adverbial expression, the first word of a complex constituent, or the verb. In longer sentences beginning, say, with an adverb followed immediately by one or more clitics, it is frequently the case that the verb occurs later and is separated from the clitic(s) by one or

more constituents. However, many of the sentences that one encounters, particularly in speech, are quite short. Moreover, quite a large proportion of these short sentences consist of just one constituent and one or more clitics. In such sentences the one constituent is far more likely to be a verb than, say, an adverb. It seems likely therefore that combinations of a main verb and a clitic auxiliary will be encountered rather more frequently than, say, an adverb and a clitic pronoun. The suggestion is, then, that the more frequent combinations are more susceptible to lexicalization. Another example of a frequently encountered combination is that of a verb and a reflexive pronoun, and in Russian such verbs have carried the process of lexicalization (and grammaticalization) to the stage where what used to be a reflexive clitic is now a verb suffix. In the course of such increasing lexicalization in a language, the possibility gradually arises that, in sentences where the verb is not the first constituent, the clitic will be attached to the verb rather than occur at 2P. As for the unidirectional nature of the change in clitic positioning, this would depend on the unidirectional nature of lexicalization, which in NCG would be seen as involving a gradual strengthening of connections in the network as a result of increased frequency of use. Among the many details that still need to be worked out, I will mention only one. It is relevant to determine to what extent lexicalization might involve whole classes of verbs and, say, pronominal clitics, e.g. verbs of giving and dative pronouns, rather than merely specific combinations such as S-Cr *Daj mi...!* 'Give me ...!'.

In discussing 'prototype effects' in the light of NCG's account of language learning, Lamb writes (1999:226): 'One happy consequence... is that the network will automatically account for prototypicality phenomena without any additional theoretical equipment'. In a similar way, one might perhaps speculate that certain aspects of linguistic change result inevitably from the normal use of a grammar in production and understanding.

5. SUMMARY. In this investigation of clitic systems I have argued that clitics, by their nature, are best investigated from a diachronic point of view. Valuing both functional and formal accounts of linguistic data, I considered a variety of theoretical frameworks in a search for enlightenment on the chosen topic. The approach that offers the greatest hope of success is Lamb's (1999) neurocognitive network grammar and in particular its proposed formalization of the lexicalization process.

<sup>1</sup> This work has been supported by a grant from the School of Oriental and African Studies, University of London, which is gratefully acknowledged. The oral version of the paper was presented at LACUS Forum 29 in Toledo, Ohio, but the author became ill at that meeting and was then unable to complete the written version in time for it to be considered for inclusion in *LACUS forum* 29; hence its submission now one year later. It fits under the heading of 'the real-world use of language', a sub-theme of both Forum 29 and Forum 30. While preparing this version of the paper I have benefited considerably from discussions with Janez Orešnik and Simona Bennett.

- <sup>2</sup> I have substituted the more explicit abbreviations 'IntP' and 'PhonP' for Radanović-Kocić's 'IP' and 'P'—in particular since in section 4.1.2 'IP' is employed in its more familiar use as the abbreviation of 'INFL Phrase'.
- <sup>3</sup> Clitics are italicized in these and all subsequent examples.
- <sup>4</sup> In Bennett (2002) I abbreviated 'second position' as 'P2'. Here I am converting to Halpern's usage: '2P'. Likewise I am adopting his '2W' for 'after the first word'. However, I have preferred '2C' ('after the first constituent') to Halpern's '2D' ('after the first daughter').
- <sup>5</sup> For present purposes it is unimportant that Halpern later posits a 'CleftP' constituent and adjoins clitics to this.
- <sup>6</sup> For further discussion, see Bennett (2002:179,184).
- <sup>7</sup> Halpern (1995), Progovac (1996) and Anderson (2000) all assume that a S-Cr genitive expression cannot be split from its head noun. The only native speaker on whom I have tested the acceptability of example (13) judged it to be acceptable. However, whatever the facts are in particular dialects with regard to this type of example, the general point remains valid that some constituents are more tightly structured, and therefore less easily interrupted, than others.
- <sup>8</sup> Lockwood (1987) presents an early RNG analysis of clitics. It is similar to Radanović-Kocić (1996) to the extent that it assumes that not much needs to be said about clitics on the lexemic stratum, i.e. in the syntax. The main burden of the analysis is located in the morphology and it takes the form of a mechanism for inserting appropriate boundaries in morphological words to trigger the insertion of the appropriate transitions in the phonology. The article is similar to Klavans (1985) in that it is concerned to set up an overall typological framework for clitics. It does not discuss diachronic facts, which are my main concern in the present article.

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# LOCATIVE AND BENEFACTIVE VOICE CONSTRUCTIONS: A LOOK AT PREPOSITION INCORPORATION

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THIS PAPER DISCUSSES the formation of locative and benefactive voice constructions in Cebuano while addressing the observation that the verbal affix, *-an*, in addition to selecting an oblique nominal as the focus of a resulting sentence, also functions as an applicative by expanding a verb's subcategorization frame to include an oblique nominal as an internal argument. In the process of forming these voice constructions *-an* also appears to take on the lexical meanings of prepositions since an erstwhile oblique argument now functions as an accusative or dative argument. This paper further discusses the possibility that all of these functions of *-an* are the result of preposition incorporation as outlined in Baker (1988). Through this paper, the coverage of incorporation theory is expanded to include a Philippine language, which unlike the languages addressed in Baker's discussion, has the typology of a VSO language, thus adding to the syntactic robustness of incorporation theory.

## 1. DISCUSSION.

1.1. FOCUS SELECTION. Cebuano, one of the major languages of the Philippines, has a complex voice marking system that consists of selectional agreement between verbal affixes and a focus nominal marker, *ang*. The application of verbal morphology to a verb stem selects a specific argument from the verb's argument structure as the focus of a resulting sentence. Although focus selection is not exactly equivalent to voice distinctions, i.e. the distinction between active and passive voice constructions, as noted in Sells (1997), the correlation provides a framework within which to discuss the functionality of the Cebuano affix *-an*. What has been termed as dative shift may be closer yet to the Philippine notion of focus, though in Cebuano any definite nominal may be selected as the focus of a sentence, not just an accusative object through passivization or a dative object through dative shift.

The English sentences given in examples (1) and (2) demonstrate a focus or voice change much the same way as is done in Cebuano, minus the verbal morphology. The sentence in example (1) focuses on the recipient, the teacher, while the sentence in example (2) focuses on the object, the book. This can be seen by asking the questions, To whom did the child give the book, and What did the child give to the teacher. The first question elicits the response found in example (1), while the second elicits the response found in example (2).

- (1) The child gave the book to the teacher.

|    |     |    |      |
|----|-----|----|------|
|    | D   | I  |      |
| F  | ang | 'y | Prep |
| NF | sa  | og | sa   |

Figure 1. Cebuano nominal markers.

- (2) The child gave the teacher the book.

Much like the difference between the two English sentences in (1) and (2), the notion of focus in Cebuano moves one nominal to the forefront of an utterance or sentence. The three possible Cebuano sentences resulting from the two English sentences in examples (1) and (2) are given in examples (3)–(5), with (4) added as a kind of passive equivalent. Each sentence has a different noun focus.

- (3) *Nag-hatag ang bata sa basahon sa tigtuldlo*<sup>1</sup>.  
AF-gave FM child the book to teacher.  
The child gave the book to the teacher. (Active Voice)
- (4) *Gi-hatag sa bata ang basahon sa tigtuldlo*.  
OF-gave the child FM book to teacher.  
The child gave the book to the teacher. (Passive Voice)
- (5) *Gi-hatag-an sa bata ang tigtuldlo sa basahon*.  
LF-gave-AP the child FM teacher the book.  
The child gave the teacher the book. (Dative Shift)

It should be noted that although all three of these voice constructions are possible, the most natural is the object focus, or passive sentence found in (4). This is due to the definite nature of the direct object, the book. When the direct object is indefinite, then the sentences in (3) and (5) would seem more natural.

1.2. NOMINAL MARKING. Every nominal in Cebuano is preceded, or marked, by a syntactic particle that bears that nominal’s grammatical features. **Figure 1** shows these markers and their associated features.

The four markers in the main matrix are each associated with two features, one relating to focus specification, and the other to definiteness. The focus marker, *ang*, has the features definite and focus, while the remaining three markers are either non-focus or indefinite. As mentioned above, in order for a nominal to be brought into focus, it must be definite. The last nominal marker, *sa*, has a third feature associated with it, that of position. It is labeled in the figure as a preposition and is inherently definite and non-focus.

1.3. VERBAL MORPHOLOGY. Almost every Cebuano sentence containing a verb adds to that verb a voice marker or conjugation associated with a particular focus. It is these voice markers in conjunction with the focus marker, *ang*, that establish a certain,



|        | Actor | Object   | Locative |
|--------|-------|----------|----------|
| Past   | Ni-   |          |          |
|        | Nag-  | Gi-      | Gi- -an  |
|        | Naka- | Na-      | Na- -an  |
| Future | Mo-   |          |          |
|        | Mag-  | i- / -on | -an      |
|        | Maka- | Ma-      | Ma- -an  |

**Figure 2.** Cebuano verbal paradigm.

definite nominal as the sentential focus. The voice marker *-an*, is associated with locative and benefactive voice sentences. **Figure 2** shows a number of these voice markers along with their corresponding focuses.

The voice markers are also separated by tense. Benefactive voice constructions are coordinated by the same voice markers as locative voice constructions. It is important to note that the voice markers for object and locative constructions vary only in the addition of *-an* to the locative column.

1.4. APPLICATIVES. The three Cebuano sentences from (3)–(5) are revisited in (6)–(8), only now the direct object in (6) and (8) is indefinite, providing for a more natural reading.

- (6) *Nag-hatag ang bata og basahon sa tigtuldlo.*  
AF-gave FM child a book to teacher.  
The child gave a book to the teacher.
- (7) *Gi-hatag sa bata ang basahon sa tigtuldlo.*  
OF-gave the child FM book to teacher.  
The child gave the book to the teacher.
- (8) *Gi-hatag-an sa bata ang tigtuldlo og basahon.*  
LF-gave-AP the child FM teacher a book.  
The child gave the teacher a book.

In (6), the voice marker *nag-* selects the actor, or agent, of the sentence as focus. This nominal is therefore marked with *ang*. In (7), the voice marker *gi-* selects the direct object as focus, while in (8), the combination of *gi-* and *-an* selects the indirect object as focus. We further notice in (8) that the preposition marker, *sa*, which previously marked the indirect object, has been replaced by the focus marker, *ang*. Once *sa* is replaced by *ang*, the nominal can no longer function as an oblique or dative argument. Its position feature is lost, since *ang* only carries two features, those of definiteness and focus.

Though the position feature has been lost from the focused nominal, it cannot just be deleted if the semantic integrity of the sentence is to be preserved. In remedy of the inability of *ang* and *sa* to swap features, the position feature of *sa* is realized by an applicative added to the verb stem. It is the voice marker *-an* in Cebuano that fulfills this role.

That is why in **Figure 2** the only difference between the verbal marking for object and locative voice constructions is the addition of *-an* to the locative column. The applicative allows the verb to treat an indirect or oblique argument as if it were an accusative argument. In fact, generally the new accusative object syntactically replaces any other accusative objects by occupying the position closest to the verb. The original accusative object is then treated syntactically as a second object. As we have seen from example (8), once *ang* marks a nominal as focus, it can no longer function as an oblique or dative argument. In this sense, it has become equivalent to an accusative object and therefore retains, in addition to *-an*, the object voice marking.

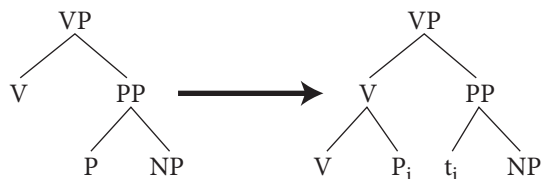
Two further examples, (9) and (10), show *-an* functioning as an applicative where the applied object in (10) is the oblique object of (9).

- (9) *Nag-kuha ang bata og isda (gikan) sa lamesa.*  
 AF-took FM child a fish from table.  
 The child took a/some fish from the table.
- (10) *Gi-kuha-an sa bata ang lamesa og isda.*  
 LF-took-AP the child FM table a fish.  
 The child took from the table a/some fish.

Up to this point the applied object in the examples has been an indirect object, which arguably is already part of a verb's subcategorization frame. Oblique arguments on the other hand are generally considered adjuncts and not part of a verb's subcategorization frame. The applicative functions in the same way regardless of whether the applied object corresponds to a dative or an oblique argument. This leads us to believe that in Cebuano the second object of double object constructions is treated as if it were an adjunct. This should come as no surprise considering the nominal marking on the second object always has position associated with it, and we have seen that when *sa* is replaced by *ang* the applicative *-an* always appears on the verb.

It is also worth noting that in Cebuano there are a few prepositions that have fully lexicalized forms in addition to the marker *sa*. One of these lexicalized prepositions is seen in (9). The Cebuano word *gikan* 'from' can optionally precede the nominal marker *sa*. Generally, these lexicalized prepositions are used to alleviate possible ambiguities that may result from statements of directionality such as from, to, or for.

- (11) *Nag-palit ako og tinapay gikan sa bata.*  
 AF-bought FM.1ps bread from child.  
 I bought some bread from the child.
- (12) *Nag-palit ako og tinapay para sa bata.*  
 AF-bought FM.1ps bread for child.  
 I bought some bread for the child.
- (13) *Gi-palit-an nako ang bata og tinapay.*  
 LF-bought-AP I FM child some bread.  
 I bought some bread from/for the child.



**Figure 3.** Incorporation of a preposition into a verb (Garrett 1990:185).

The sentences in (11) and (12) would be identical if it were not for the lexicalized prepositions *gikan* and *para* that make the directionality of the bread-buying explicit. Further, in (13), the lexicalized distinction between ‘from’ and ‘for’ is lost with the replacement of the nominal marker *sa* by *ang*. Although *-an* is able to preserve the position feature of the applied nominal, it cannot directly code for any lexicalized information that accompanied the nominal. In this sense, *-an* codes for the whole gamut of possible prepositional meanings and is not able to discriminate lexically between individual senses. Other ways to deduce the exact prepositional meaning of *-an* must be found. Though a greater context is needed to discriminate between the two possible meanings of *-an* in (13), some ways in which the prepositional meaning of *-an* can be gleaned from the properties of individual sentences will be addressed later on in this paper.

**1.5. INCORPORATION THEORY.** Baker’s incorporation theory is a syntactic theory of function-changing processes that proposes head-to-head movement as the basis of noun, verb, and preposition incorporation. It takes as its basic framework Chomsky’s Government and Binding theory (GB). This paper looks into preposition incorporation, as it appears to be able to explain the various functions of *-an* that have previously been described. As in GB, the sub-theories of government, binding, and case play a large role in the analysis of incorporation structures, especially when licensing of traces is concerned. Also, the Empty Category Principle (ECP) is active in determining the grammaticality of incorporating constructions. **Figure 3** is a diagram of the syntactic structure of preposition incorporation. It shows the adjunction of a preposition by the main verb.

This diagram can account for proper binding and government of the preposition trace through the theta criterion and the empty category principle. The applicative in Cebuano adds an argument to the verb’s subcategorization frame to satisfy the theta criterion. Since the preposition, as an applicative, has adjoined with the verb through head to head movement, it both c-commands its trace and is co-indexed with the verb and is therefore not a barrier to government. Further, before the preposition moves out of the prepositional phrase it gives case to its complement. The result is a grammatically correct sentence and an explanation for the movement of applied objects next to the verb.

In applying this analysis to *-an* with the help of examples (14) and (15) we see that in example (14) the oblique object is marked by *sa*, and thus there is no *-an* on

the end of the verb. Yet, in example (15) when *sa* has been replaced by *ang*, *-an* has attached to the main verb, and the focused object, *ang tigtuldlo*, has moved in front of the accusative object, *og basahon*. Baker's incorporation theory can thus explain both the appearance of *-an* in the Cebuano verbal paradigm and the necessity for it to acquire the various prepositional meanings inherent in the nominal marker *sa*.

- (14) *Gi-hatag sa bata ang basahon sa tigtuldlo.*  
 OF-gave the child FM book to teacher.  
 The child gave the book to the teacher.
- (15) *Gi-hatag-an sa bata ang tigtuldlo og basahon.*  
 LF-gave-AP the child FM teacher a book.  
 The child gave the teacher the book.

## 2. APPLICATION.

2.1. COVERAGE. Now that we have seen that incorporation theory can explain the functionality of *-an* as a voice marker, an applicative, and in a sense a preposition, we will explore the coverage of this voice marker. One of the interesting issues with a language that explicitly codes its sentences for various focuses is how the non-native speaker can make sense of the focus selection. Though not the main concern of this paper, the discussion up to here sheds a lot of light on how these voice constructions can be understood. Voice constructions formed with *-an* have proven especially difficult at times to understand. There are a number of grammatical constructions that on their face seem as though they should not be marked by *-an*. Yet, considering that *-an* carries the feature position, and by extension acquires various prepositional meanings, many of these confusing constructions become clearer. The sentences in (16)–(29) demonstrate the applications of *-an* in forming voice constructions.

- (16) *Nag-kuha ang nanay og isda (gikan) sa lamesa.*  
 AF-took FM mother a fish from table.  
 The mother took a/some fish from the table.
- (17) *Gi-kuha-an sa nanay ang lamesa og isda.*  
 LF-took-AP the mother FM table a fish.  
 The mother took from the table a/some fish.

Examples (16) and (17) show the difference between active and locative voice constructions when the applied object was a locative adjunct. Again, the lexicalized preposition *gikan* drops from the locative voice construction. The prepositional meaning is semantically recoverable due to our pragmatic knowledge about the verb 'take' and tables. It would not make sense to take the fish for the table.

- (18) *Nag-luto ang nanay og isda (para) sa bata.*  
 AF-cook FM mother a fish for child.  
 The mother cooked a/some fish for the child.

- (19) *Gi-luto-an sa nanay ang bata og isda.*  
 BF-cook-AP the mother FM child a fish.  
 The mother cooked the child a/some fish.

Examples (18) and (19) show the difference between active and benefactive voice constructions when the applied object was a benefactive adjunct. The lexicalized preposition *para* drops from the benefactive voice construction, but again, the prepositional meaning is semantically recoverable due to our knowledge about the verb 'cook' and the things that we cook.

- (20) *Nag-hatag ang nanay og isda sa bata.*  
 AF-give FM mother a fish to child.  
 The mother gave a/some fish to the child.
- (21) *Gi-hatag-an sa nanay ang bata og isda.*  
 BF-gave-AP the mother FM child a fish.  
 The mother gave the child a/some fish.

The sentences in (20) and (21) parallel those that we just looked at, but they differ in an interesting way. They are equivalent to double object constructions in English. Yet, as was previously mentioned, the dative arguments in these constructions do not seem to be part of the verb's subcategorization frame in that *-an* still functions as an applicative here. The interesting thing, though, is that in constructions such as these, the suffix *-an* can only be interpreted as 'to'. There is no other possible reading. Other verbs that follow this pattern are *baligya* 'sell', *tudlo* 'teach', *tabang* 'help', *sulti*, 'speak', and *sulat* 'write'. 'Speak for' and 'sell for' are not possible readings of these constructions. This may be the result of overextension, in that *sa* must always be replaced by *-an*, regardless of whether *-an* is serving as an applicative or not. Whatever the reason, the result is a mandatory 'to' reading of *-an*.

- (22) *Nag-lingkod ang bata sa lingkuranan.*  
 AF-sat FM child in chair.  
 The child sat in the chair.
- (23) *Gi-lingkor-an sa bata ang lingkoranan.*  
 LF-sat-AP the child FM chair.  
 The child sat in the chair.

Examples (22) and (23) are again locative voice constructions. But (22) and (23) have no corresponding object voice construction. One can only sit *in* or *on* a chair.

The remaining examples are less intuitive and represent constructions that often confuse the non-native.

- (24) *Nag-hugas ang nanay sa plato.*  
 AF-washed FM mother the plate.  
 The mother washed the plate.

- (25) *Gi-hugas-an sa nanay ang plato.*  
 LF-washed-AP the mother FM plate.  
 The mother washed the plate.

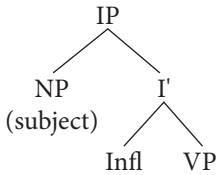
Examples (24) and (25) appear to be typical transitive sentences in which there is no oblique argument. It should not be possible to form a locative or benefactive construction from this sentence, but just the opposite is true. There is no object voice construction available for these sentences. Upon further scrutiny, the *-an* does in fact represent an incorporated preposition in example (25). Semantically speaking, the plate is not affected by the washing nearly as much as the objects that are washed off or washed from the plate. Even though no overt object is said to be washed from the plate in example (25), there is in fact an implied object or substance receiving the direct action of washing. This forces the plate to be a second object or an oblique object, as we have described it. Other verbs of this type are *silhig* 'sweep', *trapo* 'dust', and *laba* 'launder'.

- (26) *Naka-limot ang nanay sa isda.*  
 AF-forgot FM mother the fish.  
 The mother forgot the fish.
- (27) *Na-limt-an sa nanay ang isda.*  
 LF-forgot-AP the mother FM fish.  
 The mother forgot the fish.

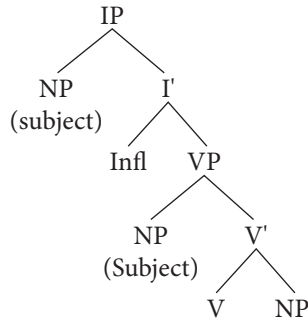
Examples (26) and (27) also appear to be transitive sentences with no oblique argument to bring into focus. Yet, like examples (24) and (25), there is an implicit argument that forces the overt argument to be oblique. Since there is the possibility of forgetting some specific thing about the object, say where the fish was placed, the accusative argument is this information and the fish, the oblique one. Therefore, the *-an* in example (27) codes for the preposition 'about.' The Cebuano verbs *hinumdom* 'remember' and *ila* 'know' function in the same way.

- (28) *Ni-adto ang nanay sa merkado*  
 AF-went FM mother to market.  
 The mother went to the market.
- (29) *\*Gi-adto-an sa nanay ang merkado*  
 LF-went-AP the mother FM market.  
 The mother went to the market.

Finally, (28) and (29) represent a scenario where one would expect to find a locative voice construction, but instead find that it is disallowed. It is possible that this construction is disallowed because only ditransitive verbs such as those seen in examples (20) and (21) allow the prepositional meaning 'to' to be encoded. It is possible yet that even though the market is an oblique nominal, there is no need for an applicative



**Figure 4.** Subjecthood in Government and Binding.



**Figure 5.** The subject position assumed under VISH

since the verb ‘go’ accepts an oblique nominal as part of its subcategorization frame. In any case, the answer to this puzzle is worth pursuing in future papers.

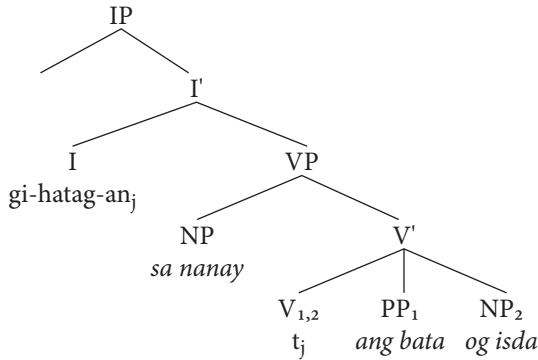
**2.2. VERB-INTERNAL SUBJECT HYPOTHESIS.** In GB it was first believed that the subject of a sentence was defined by a certain position in a syntactic tree structure. That position was the specifier position of the IP node. **Figure 4** is a graphic representation of this subject position.

For most typologies, this structural definition of subject worked well enough. But for languages with a VSO typology, there was no syntactic node left in which to place the verb above the subject. Because of this the verb initial subject hypothesis (VISH) was proposed. According to this new hypothesis, the subject of a sentence actually originates in the specifier position of the verb phrase. In most languages, it raises up to the specifier position of IP to check features. In VSO languages though, the subject has weak features and does not raise to check features until logical form. It is the verb in these languages that has strong features and which must move to the I node to check those features, thus moving over the subject before logical form. **Figure 5** is a graphic representation of the subject position assumed under VISH.

With this modification to GB, the incorporation analysis of Cebuano locative and benefactive constructions holds for the typology as well. When the verb raises to check features the applicative raises along with it, since it has already undergone head-to-head adjunction. **Figure 6** (overleaf) shows the syntactic parse for (21).

In **Figure 6** we can see that the verb now takes two arguments, the applied object and the original accusative object, as is shown by the subscripts. Further, we see that the subject of the sentence originates in the specifier position of the verb phrase and that the verbal complex raises over it to the I node in order to check features, thus supplying us with the correct VSO configuration.

**3. CONCLUSION.** In this paper we discuss how locative and benefactive voice constructions are formed in Cebuano. Further, we see that *-an* does much more than mark a



**Figure 6.** A syntactic tree diagram of a benefactive voice construction.

particular type of voice construction. It also serves as an applicative, expanding a verb's subcategorization frame to include an oblique nominal functioning as an accusative object. From Baker's incorporation theory, we learn that *-an* is not only an applicative, but an incorporated preposition, thus explaining why *-an* appears to code for various prepositional meanings. Through analyzing various voice constructions formed with *-an*, we have identified and possibly explained a number of the unexpected voiced constructions formed by *-an*. Why inherently oblique sentences formed by verbs such as 'go', 'walk', and 'run' disallow voice constructions formed by *-an* remains unresolved and remains an interesting topic for a later paper. Lastly, we see that by adopting VISH as part of the GB framework, incorporation theory can also account for the VSO word order of Cebuano.

<sup>1</sup> AF, OF, and LF represent actor, object, and locative focus, respectively. FM and AP represent focus marker and applicative.

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## RELATIVITY IN GRAMMATICAL CATEGORIZATION: EVENT QUANTIFICATION

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NATURAL LANGUAGES DIFFER. Long before the hypothesis of linguistic relativity was formulated, linguists wondered whether these differences affect the way their speakers think and conceive reality. But it is not only natural languages which differ. The meta-language of linguists, who describe languages, also differs. And these differences affect how linguists think about linguistic phenomena. So descriptions of languages are derivative from the linguist's 'world-view', which imposes a particular grid on the way linguistic data are interpreted.

In this paper I argue that to investigate the claims of the hypothesis of linguistic relativity linguistics needs a system of grammatical concepts which is universal (not idiosyncratic for a particular linguist), and thus can be a reliable meta-language for describing the grammatical and conceptual peculiarities of individual languages. As an example of the problem of relativity in linguistic theorizing, I discuss the need to introduce a grammatical category of Event Quantification. This category would be responsible for various kinds of repetitions of events. As early as 1924 Jespersen stated the necessity of a category 'plural of the verbal idea' as a parallel to Nominal Number. But it is still missing from many lists of grammatical categories. Consequently, data which should have been assigned to it are referred to other categories, e.g. Aspect, Aktionsarten, Nominal Number. This mis-affiliation plays havoc with the description of the data, especially cross-linguistically. Similar data are pulled apart into different categories, consequently the semantic boundaries of those categories are artificially broadened. A good example is Aspect, for which it is impossible to formulate a general meaning. I begin by discussing the subjective and objective reasons why it has been so difficult to recognize Event quantification as a grammatical category. Following this discussion I lay out the principles on which the identification of universal categories may rest.

Finally, as an example of my approach, I propose a schema for describing the quantification of events and specify how a universal meta-language can better explain the effects of relativity.

1. RELATIVITY: LANGUAGE VS. DESCRIPTION OF LANGUAGE. The hypothesis of linguistic relativity in the broadest sense assumes that a speaker's language 'sets up a series of lexical and grammatical categories which act as a kind of a grid through which the external world is perceived' (Pütz & Verspoor 2000:ix). Though this concept is generally applied to natural languages, it can be extended to the language in which languages

are described—to the meta-language of linguistics. The system of concepts adopted by a linguist or a linguistic school influences the way the grammatical phenomena of particular languages are understood, described, generalized and correlated.

This influence is particularly important for the description of less familiar languages whose more uncommon features gave birth to the hypothesis of linguistic relativity itself. The systems of formal grammatical oppositions in these languages seemed to have no analogues in more familiar and better described languages. And the meanings of these forms often were, or seemed to be, different if not completely incommensurable with known semantic systems. So the conclusion was drawn that languages differ so much in how they partition the world that their speakers perceive this world differently.

Is this really so? The answer here is not straightforward, and that is one of the reasons why the hypothesis was not easily accepted. On one side, the answer is yes: differences in grammatical organization within individual languages often single out completely different aspects of reality. One language singles out components of the world which another language absolutely ignores. So a speaker's vision of the world is really determined by the facilities provided by the language used. But is this so for a linguist? Does a linguist have as many pictures of the world as the languages s/he knows? I think not. Linguistic theory must describe all registered languages in such a way that the descriptions of their grammatical systems can be compared with one another. To be able to do that, a linguist has to form an invariable system of grammatical possibilities, of which each particular language actualizes only some. This is a question of grammatical universals (in Greenberg's understanding) and their various actualizations in particular languages.

**2. CATEGORIZATION AND UNIVERSALITY OF THE LANGUAGE OF LINGUISTIC DESCRIPTION.** The grammatical structure of a language is not given to a linguist as a ready system. It has to be discovered. To do that, a linguist must undertake 'segmentation' and 'categorization' (Lamb 2000) of the raw material—the variety of forms and meanings. The linguist must single out formal markers which convey certain meanings, present them as a system of oppositions, and put a label on them, that is, assign the oppositions in question the status of a certain category. To be able to do that, the linguist must have a list of categories available in the theoretical framework at hand. The identification of a list of categories (and the classification of these categories) always was and still is a central part of linguistic theory. The adequacy of this list determines how adequately the individual languages are described and their similarities and differences are captured.

Working out such a system of grammatical categories is a special task of theoretical linguistics. Actually the fathers of the very idea of linguistic relativity (Gumperz & Levinson 1996:3 ff.) stressed it as a basic necessity, thus not denying universality as such (see Trabant 2000 about Humbolt). The problem was that one cannot describe aboriginal languages within the framework of classical Latin or Greek grammars. This is a legitimate but naive complaint. No grammar of a particular language can serve as a meta-linguistic universal grammar. A meta-linguistic universal grammar

must achieve at least three goals: 1) to enumerate the grammatical categories cross-linguistically as a system of potentialities (against which any particular system can be projected); 2) to propose criteria for distinguishing these categories (and their scope) from one another, and thus to produce a tool for referring actual constructions in a language to their homecategory; and 3) to formulate the inner structure of each category, that is, a system of formal and semantic oppositions which permit a systematic and uncontroversial organisation of the data.

A difficulty of the proposed approach is that it is achievable only if it is meaning-based, rather than form-based, as classical structuralism is (see discussion in Dolinina 1992). The semantic peculiarities of each category must be formulated at a high level of abstraction, so as to separate conceptually close categories from one another and to distinguish all the types of oppositions constituting the inner structure of each category. Only through such an approach can the striking differences between languages (which triggered the idea of linguistic relativity) be incorporated in a universal system of linguistic concepts and their structures compared. Finding an appropriate level of abstraction for formulating grammatical meanings is a difficult (but achievable) task. It involves a compositional analysis of the semantics of a grammatical category. The analysis undergoes constant verification and falsification when projected against cross-linguistic data. If the proper level of abstraction is captured, the system of semantic oppositions is universal; the way these abstract meanings are actualized in particular languages, however, is language-specific.

To illustrate my claims I explore the controversies concerning categorization of the semantic area of plurality of events and will argue that to describe it adequately, a specialized grammatical category with defined boundaries and defined inner structure is needed.

3. PLURALITY OF EVENTS: DATA AND GRAMMATICAL AFFILIATION. The following sentences express the most obvious types of plurality of events. They are often not marked morphologically in English, but each is marked morphologically in some languages. In brackets I provide term(s) used to identify the meaning of plurality rendered by each construction, though the terms can differ from scholar to scholar:

- (1) a. *She often visits her California relatives* (Iterative; Repetitive; Frequentive, etc.)
- b. *She used to visit her California relatives when she was younger* (Habitual)
- c. *She is always quarrelling with her relatives* (Habituality; Continuous, Generic, etc.)
- d. *The boy writes, but does not read yet; Dogs run* (Generic)
- e. *The rain rattled against the window* (Multiplicative)
- f. *They/\*he exchanged glances* (Reciprocity)
- g. *They/\*she assembled in the hall* (?Nominal Number: Agreement or ?Collectivity)
- h. *She scattered her books/\*book around the room; Each looked at the newcomer; He closed every window* (Distributivity), etc.

3.1. TRADITIONAL INTERPRETATION. Linguists (Bach et al.1995; Bondarko since 1971; Bybee et al.1994; Comrie since 1976; Dahl 1985; Hirtle 1982; Maslov 1962, 1984; etc.) generally affiliate these and many other cases of plurality of events with a number of categories: Aspect, Aktionsarten, unnamed Derivation, Nominal Number, etc. Affiliation depends on the marking mechanism. Regular verbal marking is interpreted as Aspect, irregular marking like Multifactive- Semelfactive oppositions as Aktionsart as in (2):

- (2) Russian: *pryg-a-t' / pryg-nu-t'* 'to jump, to be jumping / to jump up once'

Aleut and Hopi have a similar opposition, but with an opposite direction of derivation: the Semelfactive meaning is a basic form of the verb, the Multiplicative, a derived one. Cases of distributive plurality are identified as Nominal number, if marking is within nominal groups, as in (3):

- (3) Kabardian (Colarusso 1992:57)  
*λ'-q'as* *ø-y-a- 'f*  
 man-EACH it-3-PRES-do-able  
 'Each man can do it'

But if the marking is on the verb, as in (4), distributivity is identified either with Aspect or with Aktionsart, depending on the level of regularity of the marking mechanism.

- (4) Russian: *vyskočili / po-vyskakivali*  
 'they jumped out (as one group) / they jumped out (one by one)'

Conceptual and terminological discrepancies also appear in addressing predication versus propositional quantification. Predication is a covert category, a component of the verb's lexical meaning; it partially correlates with a Vendler-type classification of predicates. For example, *find* (like any achievement verb) always implies discrete singularity, whereas a subtype of processes—Semelfactives like *rattle*—always imply a specific type of plurality of micro-acts. When quantification is expressed in this way, some linguists classify it as Aspect, others as Aktionsarten. Propositional quantification is an overt category which adds a meaning of quantification to otherwise quantificationally neutral verbs (*He reread the book; She wrote to the editor twice*), or modifies the inherent quantificational meaning of the verb (*He knocked on the door once*). When quantification is expressed in this 'propositional' way, linguists generally classify it under Aspect. Besides, the term Aktionsart itself is used ambiguously, with at least two different meanings: the inherent aspectual features of the verbal lexeme (Dik 1997:105ff.), irregular derivational mechanisms influencing either Aspect or quantification (Isačenko 1960). The same discrepancies occur in descriptions of predication versus propositional Aspect.

Attempts within the Aspectual/Aktionsart approach to identify and enumerate natural meanings of quantification (such as Iteration, Habituality, Multiplicity, Distributivity, Generic [i.e. habits, abilities, generalizations]) were purely descriptive and did not separate Aspectual meanings from Quantificational ones in a systematic way. Thus the system of aspectual meanings was blurred by a mixture of components from two different areas.

3.2. CATEGORY OF EVENT QUANTIFICATION. Eight decades ago Jespersen (1924) argued that not only entities, but events as well, can be quantified. He proposed a special grammatical category, 'Plural of the verbal idea'. But only comparatively recently have linguists begun to address this problem again. Two monographs (Dressler 1968, Khrakovskij 1989) laid out theoretical schemas of the meaning and structure of this category and applied it to vast typological data. Several articles (e.g. Durie 1986, Rijkhoff 1991) suggested giving verbal plurality a distinct grammatical status, separate from Aspect and Nominal number values marked on verbs (Agreement).

Related as this conceptual shift is, I explain its occurrence by two types of influence. One is expansion of typological data, which demonstrated that languages have marking mechanisms specialising primarily in encoding quantificational meanings (e.g. Jelinek 1995, Mithun 1988). The second was a (re-)discovery that there are two different types of quantification marking on the verb: agreement and repeated actions (Greenberg 1972).

Many semantic oppositions of singularity/plurality are grammatically marked on the verb and would not fit into any other category than event quantification. They include diverse types of Distributivity (in Slavic languages); semantically more complicated cases like Compleitive, where plurality implies both individualization and the finality of individualized actions as a whole (5); and cases of plurality which convey partitioning, not of a group of entities, but of the action itself (6).

- (5) Ewe: *keng / keng keng* '(they) died / (they all) died (out)'  
(Kofi & Litvinov in Khrakovskij 1989:108)
- (6) Aleut: *chachi / chachila* 'to cover in one movement / to cover in several movements' (Golovko in Khrakovskij 1989:58)

These and many other cases show that event-quantificational distinctions and their encodings are wider than traditional aspectual oppositions or nominal number. Thus cases of Distributivity differ from nominal number since they semantically interpret a group of participants as a set of individuals with individual actions, so there is no distributivity meaning outside of a proposition, because disdistributivity refers to a number of events. Distributivity as event quantification can coexist formally with agreement patterns expressing nominal number. They can be encoded separately and can have contradictory values (examples discussed in Durie 1986, etc.), as in (7), where Distributivity is expressed by inflecting for nonsingular a singular (in Agreement value) verb stem.

- (7) Moses Columbian: *yəryər-ix* / *ləqləq-ix-lx* 'People are sitting / Each of the group of people has a place to sit'. (Kinkade 1977:149)

So the data require a universal scheme which can accommodate them. The question is why it is still a theoretical problem to acknowledge this category. In the next part I discuss this issue.

4. CHANGE OF A SCIENTIFIC PARADIGM: CATEGORIZATION IN LINGUISTICS. Changing theoretical frameworks is difficult for all sciences. One can refer to Thomas Kuhn (1970:5):

Normal science... often suppresses fundamental novelties because they are necessarily subversive of its basic commitments... [T]he normal research ensures that novelty shall not be suppressed for very long.

In grammatical conceptualization and consequent categorization, both subjective and objective factors account for difficulties and discrepancies with the data I discuss.

4.1. SUBJECTIVE FACTORS. Subjective factors reflect the intuitive perception and categorization of data by a scholar, which is based on the languages of the linguist's expertise and on the theoretical system within which the linguist works.

Perceiving raw data forces the linguist to think about the cognitive concepts these languages encode grammatically and lexically. Here we deal with the phenomenon of linguistic relativity in full swing—languages are different, they single out and encode different aspects of the world; a linguist must categorize these raw data. The more different patterns a linguist is aware of, the higher the level of data categorization that can be inwardly debated. For example, if the linguist is familiar only with languages where distributive meanings are encoded within NPs, the data will be perceived as nominal number. If a linguist is familiar with Slavic verbal distributive prefixes, distributivity will be categorized as Aspect or Aktionsart.

Even more influence on categorization comes from the theoretical system which is being used. This system defines the nomenclature of labels available for categorizing the observed data. If the system does not contain such a concept as event quantification, the concept will not be used, and the data reflecting it will be labelled by some other tag-name already present in meta-grammar. So the linguist perceives the linguistic world through the grid of familiar concepts. If the particular meaning of the observed form cannot fit into the already existing semantics, a new particular sub-meaning will be added to the possible meanings of a category. This is why there appeared two different semantic areas in Aspect: one responsible for opposing event as a whole to event in progress, another depicting all kinds of repetitions of events. This two-way interpretation of aspectual meanings has negative consequences for the very theoretical concept of Aspect. This heterogeneity is regularly pointed out in Slavic studies on Aspect, with the conclusion that it is impossible to formulate the generalized

meaning of Imperfective because of the nature of its particular meanings. Inclusion of quantificational sub-meanings spoils the picture. Here we encounter the second level of manifestation of relativity: the language of linguistics—that is, the terms available in the theory—define the way the data are seen, labelled and affiliated.

4.2. OBJECTIVE FACTORS. There are three types of objective factors that are obstacles to categorising found in the data themselves: 1) the procedure of identifying a category, 2) the vagueness of our intuitive perception of data, 3) the conceptual and cognitive complexity of the phenomenon in question. We take them in order.

4.2.1. THE PROCEDURE OF IDENTIFYING starts from the assumption of a high degree of congruency between a system of forms and a correlative system of meanings. But in reality this correlation is rarely so straightforward. The forms are as a norm categorically ambiguous, and the grammatical meanings are not homogeneous. For example, the meaning of an English Imperfective/ Progressive includes two components: period of time and unfolding of the event. Each of the examples in (8) can be considered as having both of these components, but in a quite different way: (8)a is a prototypical case; in (8)b the period is much longer than normal and the event itself is a string of readings; in (8)c the period is associated with a long lasting habit and can only marginally be interpreted as an unfolding event; and in (8)d the component of period is due only to the summed-up punctual/momentary actions undertaken by several people.

- (8) a. John was reading when I arrived  
b. John was reading all summer  
c. He's not reading any more than he used to  
d. They /\*He were jumping out of the bus

So considering the ambiguity of forms and the non-homogeneity of meanings, it's at the linguist's discretion where to put the boundary between the variations of meaning within one category and when it is necessary to reconsider old conceptualizations and introduce a new category.

4.2.2. INTUITIVELY IT IS NOT ALWAYS EASY to draw a line between Aspect and Event Quantification in such cases as Habitual (*They are always quarrelling*), Generic (*I do not smoke*), Continuity (*They were floating around and around*). Similarly it is not always clear whether to assign to Nominal Number or to Event Quantification a case of Distributivity/Collectivity like: *She broke dishes / She broke all the dishes / She broke each of the dishes / They broke the dishes*. These difficulties appear because Aspect, Aktionsarten, Nominal Number and Event Quantification are all related to the domain of Time and Space looked at from different perspectives. So in order to separate these categories from one another, there must be a clearly formulated conceptual basis for distinguishing the categories.



4.2.3. THE CONCEPTUAL BASIS OF EVENT QUANTIFICATION is supposed to distinguish this category from others as well as formulate a system of oppositions within each category. But conceptualising the categories and their inner structure is a complicated task because of the natural complexity of both Aspect and quantification.

5. CONCEPTUAL/COGNITIVE COMPLEXITY OF ASPECT AND QUANTIFICATION. Both Aspect and Number are much more complex (cognitively, semantically and formally) than is often reflected in grammars. The specialized literature discusses problems in conceptualising them quite vigorously.

5.1. ASPECT. Though present as a concept in all grammars, Aspect often covers quite different data because of several factors. First, different languages actualize Aspect in different types of oppositions because from the very start the category of Aspect was associated with not one but two prototypical cases: Slavic two-member opposition (Perfective-Imperfective) and Greek tri-member opposition (Aorist-Perfect-Imperfect—see discussion in Maslov 1962, 1984). Consequently in other languages Aspect was conceptualized on the basis of semantic or functional similarity with the two prototypical cases. Second, the grammatical ambiguity of aspectual forms leads linguists to affiliate Aspect with constructions having non-aspectual meaning. Third, the indeterminacy of a natural prototypical Aspect and the ambiguity of aspectual forms caused Aspect to be widened by the inclusion of numerous quantificational oppositions (Habituality, Iterativity, etc). This happened because the semantics of quantification can also contain semantic components similar to ‘period of time’ and ‘ $\pm$  unfolding of the event’. But I want to stress that the semantic components which are common to Aspect and Quantification have different values in the two categories. In Aspect they apply to a situation involving one event presented either as a whole or in its unfolding, whereas Quantification opposes situations with one event to situations with a number of events. In separating Aspect and Event Quantification conceptually, I propose to stress the singularity of the event in the definition of Aspect, and to make it the main basis for separating Aspect from Event Quantification.

5.2. NUMBER OF NOUNS, QUANTIFICATION OF EVENTS. Nominal number and event quantification are both highly complex phenomena. They are much more complex than just the opposition of singularity with plurality. (See discussion in Corbett 2000; Jespersen 1924:188; Meščuk 1991; Wierzbicka 1988, etc.).

An additional complication in describing these categories is that Quantification for nominals and for events are described in completely different terms and concepts. These differences are so great that a linguist has no sense of common grounds on which quantification is based. Nominal Number is described in a well-established system of terms: generic number (when the noun, either in Sg or in Pl or in a special form, refers to a particular type of entity—lion, elephant, etc.) and particular number. Particular number, in turn, is divided into discrete number, which has a variety of values: singular, dual, trial, paucal, plural, super-plural, composed plurals, etc.; mass



and collective number, distributive number, etc. (See Corbett 2000 with respect to a wide range of cross-linguistic data.)

Event number is described in different terms with different meanings. Besides, the terminological system itself is less well established. Thus Dressler (1968) singles out and names such types of natural meanings as Iterative (covering Discontinuative, Repetitive, Alternative subtypes, etc.), Distributive (Subject-, Object-, Reciprocal-, Dispersive-, etc. subtypes), Continuous (Usitative, Durative, etc. subtypes), and Intensive (Intensive, Emphatic, Exaggerative, etc. subtypes). Khrakovskij (1989) proposes a system of types of verbal plurality based on such parameters as 'repeated situations occur in one/in different periods of time' and 'repeated situations have the same/different participants'; the result is three principal types: Iterative, Multiplicative-Semelfactive and Distributive. Corbett (2000) distinguishes Event Number and Participant Number. None of these authors uses the parameters or types of nominal quantification for classifying event plurality. The differences in the 'languages of description' indicate that these linguists perceive the phenomena they discuss as completely different conceptual and cognitive areas. Consequently, there was no basis for a quick and natural moving of quantification of events from the aspectual domain into a domain of quantification or number, which linguists associate directly with nominals. Is it possible to formulate a framework which can unite all types of quantification under one roof? I claim that it is possible.

5.3. A MODEL FOR UNIVERSAL QUANTIFICATION. Actually there is a model of description of nominal quantification which can be directly applied to quantification of events. This model was proposed simultaneously, with minor terminological differences, by two completely unconnected scholars: Xolodovič (1979) and Hirtle (1982). This model recognizes three major types of plurality: discrete (countable), homogeneous (mass/collective), and heterogeneous plurality, and peculiarities of relations between singularity and plurality in each of these cases. The first type counts all singularities in a variety of possible ways. The second establishes relations which either divide conglomerate (mass) entities into their minimal parts/portions or unite singular entities into conglomerates, so that conglomerates are simultaneously a special singularity and a special plurality which can be divided into analogues of discrete singularities. The third treats plurality as a generic-type entity (hyperonyms) and represents singularities by a set of different particular entities (sister-hyponyms). I have argued (Dolinina 1989, 1999) that this classification can be easily applied to the description of event quantification, putting an apparent diversity of hardly comparable cases into an observable and rational system.

I base my classification on two parameters: a) the distinction between the three above-mentioned types of plurality/singularity oppositions, b) the source of event plurality. There are two main subtypes of sources of event plurality: repetition of events in time (temporal plurality) and repetition of events due to individualization of the participants of a group (distributive plurality). According to this classification temporal plurality has three logically possible sub-types: iterativity (discrete

plurality), multiplicativity-semelfactivity (homogeneous plurality), and a heterogeneous type for which there is no term even in Event Quantification. Distributive plurality can also be either discrete (cases of evident individualization, e.g. cases with *each* or *every*), homogeneous (cases of collective/mass and cumulative interpretations, including cases with *all*), or heterogeneous. There is no term for heterogeneous distributive plurality, but Dressler detected it as a special grammatical mechanism in Sierra-Nahuatl. This classification regards temporal plurality and distributivity as logically independent types, which can easily combine within one construction: *Each of them regularly visited a dentist*.

My approach allows us to view the area of quantification as one single conceptual domain, whose description is based on three similar quantificational oppositions, which in turn can be applied to different types of quantified units—units in Space (nominal quantification/Number) or units in Time (event quantification). Units in Time may in turn be only in Time (repetition of events on the axis of time) or in both Time and Space (repetition of events carried out by different participants or in different locations).

6. CONCLUSION. In this paper I argue that differences in the language of description of language (meta-language of linguistics) have the same effect on perception of linguistic data, as the differences in natural languages have on their speakers' perception of the world, according to the hypothesis of linguistic relativity. This should not happen in linguistics, because otherwise the description of a language is derivative from the linguist's individual theoretical framework, and cross-linguistic comparison of descriptions of different languages carried out within different frameworks becomes impossible. To avoid this difficulty, it is necessary to have a universal system of semantically based grammatical concepts/categories. These categories provide the terms in which languages are described and their systems can be compared. This universal system of categories constitutes the potentialities of what can be actualized in individual languages. As an example of the problem of relativity in linguistic description, I discussed the necessity to add to the universal list of grammatical categories the category of Event Quantification, whose existence is currently only marginally recognized, and demonstrated that the data encoding all kinds of repetition of actions are assigned to different categories—Aspect, Aktionsart, Nominal Number, etc. Consequently, not only are the boundaries of these categories artificially broadened, but the very description and understanding of this phenomenon cross-linguistically becomes incommensurable.

Adding new categories to the universal list (Event Quantification in particular) poses a number of challenges. One challenge reflects the difficulties (subjective and objective) in the acceptance of new categories by linguists, another reflects difficulties in forming a list of universal categories and in formulating conceptual distinctions between them. I argued that the description of universal categories must be meaning-based and needs an appropriate level of abstraction to formulate the meanings. Besides, the description of categorial meaning must both offer inter-categorial distinctions and specify intra-categorial oppositions. As an example of my approach,

I propose a schema for describing the quantification of events as a special category differing from Aspect/Aktionsarten, and also from Nominal Number.

A universal meta-grammar of the proposed type not only allows us to describe and affiliate adequately the data of individual languages, but also provides a sane ground for comparison. It also allows us to look at the phenomenon of linguistic relativity in a new way—a linguist can identify what particular areas of languages differ and in what way they create differences in perception of the common objective world in a subjective, relative way.

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## AFFIXING PREFERENCES AND WORKING MEMORY

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ASYMMETRY IN AFFIX ORDERING was observed by Sapir (1921:67) when he reported in *Language* that suffixing was the most common of the three types of affixes (prefix, infix and suffix). Later Greenberg (1963:92), with a sample of thirty languages, presented data indicating that 12 were exclusively suffixing, only one had exclusively prefixing, and 17 used both.

The goal in this paper is to examine this asymmetry from the perspective of information and error-control coding theory. One of the main themes of information theory is that signals transmitted between devices, and speech signals sent and received by human beings, are susceptible to distortion and loss due to noise and fading. Noise degrades the production or reception of a signal, and fading of the signal is due to the loss of energy in space and time as the signal travels through various channels of communication.

The focus of this paper is on the effect of fading. Fading may be defined physically as the loss of power of the signal in physical space and time, and psychologically as the loss of features in short-term memory. The items of interest will be only morphemes—roots or stems, prefixes, and suffixes—and not sentence constituents.

The hypothesis discussed is not intended to replace any of the hypotheses presented in the linguistic literature, but to complement those proposed explanations by adding the psychological factor of memory into the mix.

Before proceeding to a review of proposals to explain the preference for suffixing, I give an example from Turkish of pure suffixing and one from Dene Sųliné, an Athapaskan language, of pure prefixing.

- (1) Turkish: suffixing only (Underhill 1986:15)

|       |       |     |       |           |           |       |
|-------|-------|-----|-------|-----------|-----------|-------|
| ev    | -ler  | -im | -iz   | -de       | -ki       | -ler  |
| house | -PLUR | -my | -PLUR | -Locative | -Relative | -PLUR |

‘those which are in our houses’

- (2) Dene Sųliné: prefixing only (Li 1946:417)

|      |      |      |               |            |             |       |             |     |
|------|------|------|---------------|------------|-------------|-------|-------------|-----|
| bε-  | yé-  | xá-  | dá-           | na-        | ?ε-         | s-    | d-          | zis |
| (it- | in)- | out- | Distributive- | Iterative- | Indef.Obj.- | 1st.- | Classifier- | sip |

‘I sip out of several vessels customarily’

### 1. REVIEW OF POSITIONS ON AFFIXING ASYMMETRY.

1.1. INITIAL APPROACH. Greenberg (1957:89–91) proposed a two-pronged attack on the explanation for the usual linguistic preference for suffixing. One was diachronic

and the other was psycholinguistic. His psycholinguistic explanation was mainly in terms of the behaviorist theory of that time. However, one hypothesis was put in terms of information theory, namely, since stems will normally convey the most 'important' meaning, they will orient the hearer to expect certain categories to follow. These are usually closed classes and thus will be highly predictable and therefore high in redundancy.

1.2. DIACHRONIC APPROACH. Givón (1979:221, 275) argued that the prevalence of suffixation resulted from the possibility that languages of the world historically had a basic SOV word or constituent order, and that a large number of languages have that same order today. It is usual in these SOV languages that case and number information occur after the noun, and verb auxiliaries indicating tense, mode, aspect, voice and valence follow the verb. If this order is maintained for an extensive historical period, the processes of semantic bleaching and phonological reduction and fusion will change the nominal and verbal units after the nouns and verbs from free forms to affixes. This type of grammaticalization will be the main source for the prevalence of suffixation. Hall (1988:321–49) challenged Givón's SOV conjecture but supported the grammaticalization part of the explanation. If a language has morphological material *after* a category with which it is associated, the morphological material may be more susceptible to semantic generalization and phonological loss due to its high redundancy. Hall brings in the principle of speaker-sided economy to explain this. Given that material is more redundant after the lexical category there will be a mild reduction in hearer-sided demands for high clarity (ease of perception). That is, some semantic bleaching and phonological reduction will not greatly impinge on the hearer's comprehension. However, hearer-sided demand for clarity in production will counteract the tendency to grammaticalization of relevant morphological material occurring *before* nouns or verbs, since the stages of grammaticalization would phonologically reduce and perhaps fuse the elements with the onset of a noun or verb stem. Hall cites a hypothesis by Hawkins and Cutler (1988:280–317) that the salience and constancy of stem initial position is important for lexical access, and thus for optimization and efficiency in processing.

1.3. LEXICAL PROCESSING. Cutler, Hawkins and Gilligan (1985) reviewed psycholinguistic evidence indicating that word onsets are effective cues for successful recall or recognition of a word. Onsets as retrieval cues were shown to produce 95% correct responses when only the initial portions of a word were presented, whereas word-final fragments produced 60% correct guesses. Also, initial fragments of words were the best prompts for the recall of words from previously presented lists and middle portions were the worst cues. Moreover, word-initial prompts were the most effective cues to bring a person out of a tip-of-the-tongue state. The effects of disrupting noise such as mispronunciations or visual blurring produced the greatest difficulty in recognition performance, whereas distortions at ends of words were hardly noticed.

These data led Marslen-Wilson (1987) to propose an auditory word-recognition theory based on 'left-to-right' processing. In this model, words in the mental lexicon are arranged according to their initial similarity. This group of words was called the 'initial cohort'. A spoken word will activate the whole cohort. As more of the word is heard, some candidates in the cohort will be eliminated until most candidates are ruled out near the end of a word. The point where all the candidates except one have dropped out is the uniqueness point. This point for a word depends on the size of the cohort and the amount of left-to-right word similarity.

In production, slips of the tongue tend to preserve the initial portion of a word. Malapropisms also seem to come from within the same cohort as their intended word.

Given the cohort model, information beyond the uniqueness point should be entirely redundant. However, it has been shown that ends of words are more salient than the middles.

Cutler, Hawkins and Gilligan also use another psycholinguistic result to explain the tendency towards suffixation. They appeal to evidence that there is separate processing of stems and affixes. For example, regular inflected forms such as *dogs* show the same priming effect as the base form *dog*. It has been suggested that inflectional affixes may be stripped prior to lexical access in speech perception. Speech errors show that affixes accommodate to their erroneous rather than their intended contexts. For example, consider (3) and (4) (Fromkin 1993:281).

- (3) Inflection morpheme error:  
*rules of word formation* occurs as *words of rule formation*
- (4) Derivational morpheme error:  
*easily enough* occurs as *easy enoughly*

Other pieces of evidence come from on-line judgements of *word* versus *nonword* in lexical decision tasks. More decision time is required if a nonword has a real affix attached to it. This suggests that separate processing of the affix occurs even with a nonword stem.

Cutler, Hawkins and Gilligan put these two points together as a psycholinguistic explanation of the preference for suffixing: 1) word onsets are more psychologically salient than other parts of the word, and 2) stems and affixes are processed separately.

1.4. RELEVANCE AND SUFFIXATION. Bybee, Pagliuca and Perkins (1990) were motivated by dissatisfaction with the psycholinguistic hypothesis of Cutler, Hawkins and Gilligan because of the type of data about which their questions were formulated. They expanded the database with a sample of 71 languages that included pre- and post-posed free forms as well as prefixes and suffixes. From their data, they concluded that post-positioning is not necessarily preferred for grammatical material, but that grammatical material develops in whatever position it happens to be in at the onset



of grammaticalization. This conclusion counters the idea that lexical material is first and grammatical material follows. However, the preponderance of suffixing remains. Bybee, Pagliuca and Perkins then examine the question of why pre-posed grammatical material does *not* affix in verb-medial languages, which have the highest quantity of free preposed grammatical material. They also show that verb-final languages predominate in the amount of post-posed affixed grammatical material.

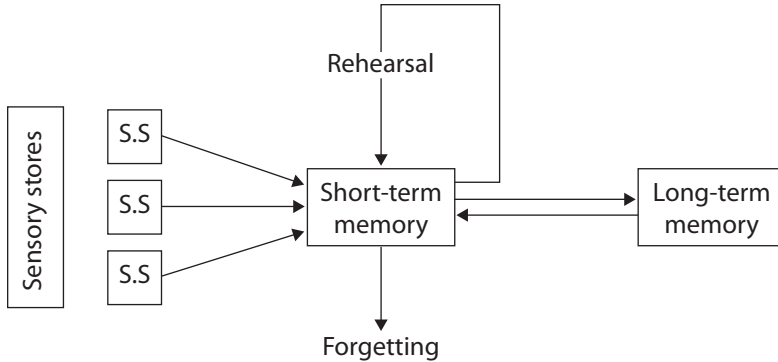
The first question is whether there is any difference in phonological reduction and fusion in pre-posed and post-posed grammatical material. They conclude that the rate of change for pre-posed materials is faster. To explain the preponderance of suffixation across languages, Bybee, Pagliuca and Perkins propose that the semantic factor of relevance to the verb stem is important. In their data, only verbs were examined. In order of relevance to the verb stem, going from weak to strong, are mood/modality, tense, aspect, valence/voice. In verb-final languages, free forms that are relevant to the main stem and that frequently co-occur tend to affix to the stem. Since SOV languages are the most frequent type, suffixing is highly frequent. However, the authors introduce a subsidiary hypothesis that grammatical material at clause boundaries, namely post-posed material in SOV languages, will affix at a high rate, no matter what. Post-posed grammatical material in SOV languages affixes to the verb on the basis of relevance, and pre-posed grammatical materials in SOV languages may affix to subject pronouns or to each other as well as to the verb. Thus prefixing would not be as common in this case.

## 2. SHORT-TERM MEMORY.

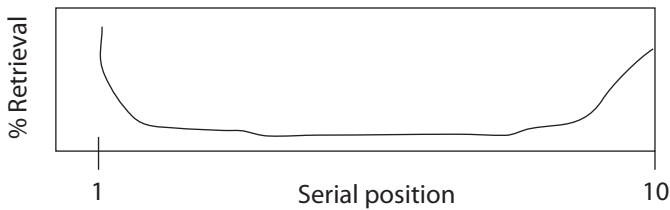
**2.1. SHORT-TERM MEMORY CURVE.** One of the weaknesses of the psycholinguistic models is that they are based on experimental data that involve stimuli drawn from European languages that, typologically, come from a closely related group. It seems difficult to extrapolate from processing results of analytic and synthetic languages to the polysynthetic and agglutinating languages found, for example, in the Americas. Furthermore, the cohort model for lexical access mainly dealt with phonological sequences in monomorphemic words, which are non-bound (free) forms. The question is, does salience generalize from the phonological onset of a word to a morpheme at the onset of a polymorphemic word?

One model that accommodates serial information is the working memory model. Miller (1956) proposed that this memory might hold seven plus or minus two elements. Miller explored why groups of famous sevens were so prevalent: wonders of the world, days of the week, colors of the rainbow, the seven dwarfs, etc. When the limit of this capacity is exceeded, Miller suggested that we chunk information. For example ten CVC words should have the same burden on memory as five CVC-CVC words. However, the former list is harder to remember because it exceeds seven chunks, whereas the latter five chunks are fewer than seven. It is also noted that telephone numbers, license plate numbers, bank machine numbers fall within this range, from five to nine elements. **Figure 1** represents an early model.





**Figure 1.** Traditional model of short-term and long-term memory.



**Figure 2.** Retrieval from memory by serial position of item in list.

Sensory stores are very short-term and are highly susceptible to fading or decay. For visual input, they are often called iconic memory, and for auditory inputs, echoic memory, which appears to be slightly longer than the iconic memory of sensory stores.

The short-term store, as mentioned above, is of limited capacity but may be enhanced by rehearsal. The rehearsal loop also has the function of turning initial visual information into auditory.

Theoretically, the long-term memory store has infinite, or at least lifetime, capacity. Short-term memory depends much on sound. Long-term memory is based on the meaningfulness of the stimuli.

Tasks related to this model typically have the graph in **Figure 2**. The graph has three important features.

1. High recall for items at the start of the list
2. Flattening of the graph in the middle
3. High recall for items near the end of the list

The high recall at the beginning is the *primacy effect*. It is taken to be due to recall from long-term memory. This item would be in a non-overload position. My hypothesis is that it is most advantageous to place the stem morpheme here in order to protect it from loss.

Stems will usually have higher information and be less predictable.

The low flat portion of the curve may reflect the period of overload in short term memory. The overload is a function of the number of items and the rate of information flow. It seems that predictability of items (Greenberg 1957) or semantic relevance plays a role here in the prevention of loss in this critical period of overload. For increased predictability, morphemes in this part of the series should come from closed classes of limited membership. Bybee, Pagliuca and Perkins (1990) state that after the verb stem, voice or valence, aspect, tense, mood or modality follow in that order. These items are usually from closed classes and decrease in semantic relatedness to the verb as the morpheme occurs farther from the verb stem. In terms of chunking, when grammaticalization proceeds to the point of fusion with the stem it can be viewed as a reduction in the number of independent units to be remembered.

The end-of-list effect is the *recency effect*. It is thought to result from activity within the short-term and sensory stores. Since these last items will fade immediately, the strategy is to retrieve them immediately. When experimental participants are observed, the last items are the ones that they write down first. In terms of morphological complexity, the next most likely position for a stem to occupy would be in the last position.

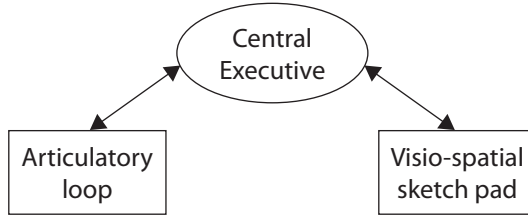
If the first and last places in a series of morphemes are privileged positions, presumably high information but low relevance morphemes may be located at the opposite end of the word from the stem.

2.2. SOME FEATURES OF SHORT-TERM MEMORY PERFORMANCE. Gathercole (1997:13–42) discussed five enduring features of working memory experiments and research, three of which are of particular interest to our discussion. They are word length, articulatory suppression, and phonological similarity.

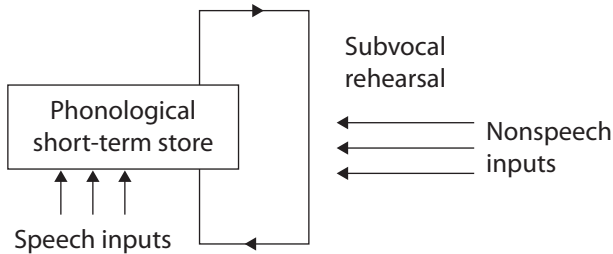
**WORD LENGTH.** The recall of unrelated items is better for those that are short in duration. For example:

- a. *say, though, tune, bird, pen, sky, lake*
- b. *deliberation, coeducation, international, gubernatorial, expiratory, differentiate, semiconductor*

The first series is recalled better than the second. This is also the case for nonwords in similar lists. Some claims have been made that this effect is not syllable-based, but is a function of duration. For example *digit* is shorter than *harpoon* and would be more easily recalled. For polymorphemic words, longer morphemes would be optimally placed where recall is higher—initially or, next best, finally. Short forms of one or two syllables should occur in the flat low-recall part of the series. In general, the working-memory model suggests that longer words require a greater amount of sub vocal rehearsal, and that greater delays in recall, promoting memory decay, may be involved.



**Figure 3.** Short-term storage: working memory (Baddeley & Hitch 1974).



**Figure 4.** The phonological loop model (Baddeley 1986).

**ARTICULATORY SUPPRESSION.** Recall is diminished when participants repeat aloud irrelevant sequences during presentation of stimuli. From the working memory model, it is believed that such blocking of rehearsal produces this effect. This feature is not too germane to the question of affixing.

**PHONOLOGICAL SIMILARITY.** Recall is poorer if items are phonologically similar. For example the first list below is more easily recalled than the second.

- a. *beet, day, pen, key, sty, log, ship*
- b. *rat, pat, map, man, can, cat, bat*

This effect occurs when stimuli are auditorily but not orthographically presented. In addition, if the second list consists of semantically similar items, then there is no advantage in recall as in the next example.

- a. *beet, day, pen, key, sty, log, ship*
- b. *big, large, wide, long, vast, tall, huge*

Baddeley and Hitch (1974:74–81) and Baddeley (1986) proposed the working memory model to account for these experimental effects. The model is seen in **Figures 3** and **4**. The working memory model shown in **Figure 3** has the following features:

- A modality-free *central executive*, which is virtually synonymous with attention.

- An *articulatory loop*, which can be regarded as a verbal rehearsal system; it resembles an inner voice.
- A *visuo-spatial sketch pad*, which is a visual eye and/or spatial rehearsal system; it resembles an inner eye

Because of the auditory nature of the phonological short-term store, only the phonological similarity of a series, and not semantic similarity, plays a role. This effect occurs if the phonological representation fades or decays, such that similar items are recalled as identical items.

Given the above model, typological predictions would be as follows:

- a. Morphemes will tend to be monosyllabic in agglutinating languages. However, monosyllabic phonotactically-possible combinations in most languages will be few in number. Thus some morphemes, most likely stems or semantically important material, will be bisyllabic or trisyllabic. In these cases, such morphemes will be found in or near the primacy and/or recency positions. These morphemes may have enhanced salience, for example through stress, consonant clusters, or full vowels.
- b. There should be an avoidance of morpheme homophony and high phonological similarity, especially in adjacent positions in a polymorphemic word.

Gathercole's remaining two features fall outside the scope of the working memory model. The fourth feature, *Lexicality*, says that recall is superior for words/morphemes over non-words/non-morphemes. To relate this to the phonological nature of the working memory, some claim the advantage is due to knowledge of the phonological structure of the words and not the meaning. A related effect is the word-likeness effect, which is that non-words that follow phonological canonical patterns are better recalled than non-words that do not follow normal patterns. Gathercole's fifth feature is concerned with the relation of short-term memory to long-term memory and addresses some possible connections with second language acquisition.

2.3. NEUROLOGICAL CORRELATES. Rouder and Gomez (2001) indicate that recency and primacy are supported by separate stores. Patients with lesions to the anterior perisylvian region have a diminished primacy effect but a preserved recency effect. Patients with damage to the inferior parietal lobule exhibit the opposite result. These results are consistent with the idea that primacy and recency are mediated by different brain structures. One linguistic repercussion is that speakers of suffixing languages may be more affected by an insult to the anterior perisylvian region, whereas speakers of prefixing languages may be affected by insults to the inferior parietal lobule. Collette et al. (2001), through positron emission tomography and magnetic resonance imaging, have shown that verbal short-term memory specifically involves the left middle temporal gyrus and the temporo-parietal junction. These areas are associated with lexical and semantic processes and thus agree with models that postulate that

long-term semantic representations influence verbal short-term memory processes. As mentioned above, the strongest semantic influence is related to the primacy effect. The influence is larger for words over non-words, and also for high frequency and high imageability words over their low counterparts. Finally, patients who have phonological processing deficits show greater primacy than recency effects, and patients with semantic processing defects show greater recency than primacy effects, indicating the involvement of multiple linguistic codes in short-term memory.

3. CONCLUSION. This paper presents a psycholinguistic hypothesis based on principles of information theory to explain the preference for suffixing in polymorphemic words across languages that are highly agglutinating. The most preferred position for a stem, which presumably carries high semantic information, would be at the beginning of the word, in order to capitalize on the primacy effect of short-term memory. Semantic processing is also best in this position, since the on-coming overload is temporarily not in effect. In addition, this model predicts that (1) morpheme length should be short and, (2) sequences of morphemes should lack any phonological similarity. Since some languages have the stem in final position, it can be said that these languages exploit the recency effect position instead of the primacy effect position.

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## MODELING STRESS IN SALISH LANGUAGES

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THIS PAPER DISCUSSES the stress systems of two different Salish languages and how they can be modeled by a computer. It will be shown that, for at least one Salish language, stress is not well documented or completely understood. Any rule-based approaches that have been proposed for stress in these languages often run into serious problems. Similarly, the prevailing approach for computer modeling of rule-based morphophonological behavior—the two-level, finite-state approach—runs into several difficulties. This paper proposes, for the first time, to perform modeling of stress in Salish languages by using analogy. Analogical stress-assignment modeling is exemplified for English first and then pursued for the two Salish languages. The modeling methodology presented includes manipulation of source text corpora, feature specification, analogical procedures, and results. Possible future work and other applications will also be discussed.

1. SALISH LANGUAGES. The Salish language family consists of some two dozen Native American languages along the Pacific coast of the U.S. and Canada, including Vancouver Island. As most of these languages are moribund, much effort is being expended in collecting data from the remaining speakers and in analyzing the results of previously assembled collections. Unfortunately, little work has been undertaken in psycholinguistic or cognition-based investigation into these languages.

This paper reports on recent research involving two Salish languages: Lushootseed, a Coast Salish language spoken at the western edge of Salish territory, and Kalispel, an Interior Salish language spoken at the eastern edge. The study thus addresses two languages from different subfamilies that illustrate significant variation within the family, particularly with respect to the topic at hand: lexical stress. The rest of this section surveys stress and related linguistic phenomena in Salish.

1.1. GENERALITIES. Salish languages typically have a very rich consonantal inventory, while on the other hand, the vowel inventory varies widely in richness across the family. Lushootseed has relatively few vowels (four) whereas Kalispel has more (six). Roots are usually straightforward, with most only having one or two syllables. The languages' orthographies tend to follow the IPA system fairly closely when deviation from traditional Roman-alphabetic characters is required.

Salish languages are polysynthetic and notorious for their complex morphology, morphophonology, and morphosyntax. They exhibit extensive inflection and derivation, with words often changing category and function as morphological processes

operate on them. In addition, most languages have a complex phonology including several reduplication patterns, vowel harmony, and remarkable consonant clusters. One unique class of morphemes present in all Salish languages is the set of bound lexical morphemes called lexical suffixes, which usually number more than one hundred per language. Further details are available elsewhere (Hess 1995, 1998).

1.2. STRESS. Stress in Lushootseed is relatively straightforward among Salish languages. Usually it falls on the root's first non-schwa vowel. However, some exceptions exist; schwas are occasionally stressed, and sometimes the stress falls farther back on the root than its canonical position. Furthermore, different reduplication patterns introduce different behaviors with respect to stress. In addition, some stress-related minimal pairs exist: *swátix<sup>w</sup>tád* means 'world, region' whereas *swatíx<sup>w</sup>tád* means 'a member of the plant kingdom'. Finally, stress occasionally migrates from the root onto suffixes or lexical suffixes. Overall, though, stress is sufficiently predictable in Lushootseed that it is usually not indicated in texts.

On the other hand, stress in Kalispel is much more complex and often escapes principled analysis. Generally Kalispel words have one weakly stressed vowel per word, but its position varies widely. This is due to rampant shifts induced by morphological processes such as affixation, cliticization, and reduplication, as well as phonological processes such as vowel harmony. In turn, these stress shifts introduce their own phonological side-effects such as ablaut, glottalization and even the unrecoverable truncation of phonemic content.

Perhaps the foremost Kalispel linguist, the Norwegian Hans Vogt, recorded his view of the stress rules of that language with considerable hedges, hypothesizing, and hesitation. For example, he considered the determination of stress an unsolved problem when lexical suffixes are involved: 'It has not been possible to find the general rules which determine its place. The available examples seem contradictory...' (Vogt 1940:51). This is still apparently the case today.

Clearly any attempt to implement a model of stress assignment for these languages (or at least for Kalispel) in terms of identifiable rules based on the most thorough linguistic descriptions available would be a daunting task. Simply developing a comprehensive and comprehensible knowledge base of pertinent information would seem infeasible. Its implementation, even using well-understood techniques such as finite-state modeling, would challenge even the most experienced computational linguist. Fortunately, recent progress in the areas of natural language processing and machine learning have provided ways to develop such systems using language data itself, instead of metalinguistic tools and descriptive methods.

2. ANALOGICAL MODELING. This paper proposes, for the first time, to perform modeling of stress in Salish languages by using analogy (Skousen 1989). The theory and implementation pursued is called analogical modeling (AM), and it has been successfully used in several language modeling tasks. AM is a data-driven, exemplar-based



approach to modeling language and other types of data; in many respects it contrasts with rule-based, connectionist, and traditional statistical approaches.

For example, AM does not require an explicit knowledge representation of the task to be implemented; no rule base or constraint set has to be hand-crafted to assure system functionality. Secondly, AM is more flexible and robust than many competing models, especially in the presence of contradictory or incomplete data. Finally, it has been shown that AM can account for various types of language phenomena in more cognitively plausible ways than can purely statistical methods. More details on these and related topics are documented elsewhere (Skousen, Lonsdale & Parkinson 2002).

As is the case for many machine learning systems, AM was developed as a reaction to mainstream descriptive linguistics, designed to account for real-world data by focusing on instances of language use. The system works as follows: The user presents to the system several instances of data (perhaps hundreds or thousands) that serve as exemplars; these in turn are compared to some test item(s) that the user inputs. Given this store of exemplar data, the system determines which outcome(s) is (are) the best match(es) via an exhaustive process of analogy. Ultimately, the system as implemented acts as an analogical categorizer/classifier that learns from exemplars and assigns an outcome to each test instance.

The most fundamental unit of analysis in the AM system is the feature; several features combine together to describe each exemplar and each test data item. A vector of up to 27 or so features can be developed for each item. Determination of which features should be used varies by the task being implemented. The rest of this section sketches linguistic applications of AM, including stress.

**2.1. ANALOGICAL LINGUISTIC MODELS.** AM is gaining in popularity as a non-rule-based paradigm for modeling language use in a wide variety of languages and linguistic topics. In most cases, AM work seeks to model real-world language, which usually involves matching the results of psycholinguistic experiments or, alternatively, leveraging corpora that reflect actual written or spoken communication.

Most of the noteworthy work in AM has to date involved relatively low-level linguistic phenomena: investigations involving phonological variation, morphophonemic alternation, morphological processes, and historical morphological evolution. This paper follows this tradition by treating stress, a primarily phonological phenomenon that interacts heavily with morphology in Salish languages.

**2.2. STRESS BY ANALOGY.** This section introduces a method for modeling stress by analogy, focusing on a small illustrative example in English. Suppose we want to model stress assignment in four-syllable English words. We could use a traditional rule-based approach such as that discussed in a typical phonological textbook, implement some set of interacting constraints as in done in Optimality Theory, or employ some machine learning or statistical techniques to discover any regularities in the data we are given. We will assume that, for the reasons sketched above, knowledge-based approaches such as the first two, and the statistical techniques mentioned in the

third would not be satisfactory methods for arriving at the most plausible modeling scenario. Instead, we use AM. The relevant process that was followed in developing exemplar and test data for this task as it was implemented is described next.

First, a source for phonemically transcribed four-syllable words in English was required. A useful resource is the MRC psycholinguistic dictionary (Colthart 1981), which gives a close phonemic transcription for several thousand English words, including three levels of stress<sup>1</sup>. For example, in the following encodings the left-hand column indicates the stress pattern (2=primary stress, 1=secondary stress, 0=no stress), the middle row indicates the (rather idiosyncratic) phonemic transcription<sup>2</sup> with slashes delimiting syllables, and the third column indicates the orthographic form of the word:

|      |                 |                |
|------|-----------------|----------------|
| 0102 | I/lek/S@/nI@    | ELECTIONEER    |
| 0120 | aI/dI@/lIs/tIk  | IDEALISTIC     |
| 1002 | Vl/tr@/m@/rin   | ULTRAMARINE    |
| 1020 | ek/sp@U/nen/S@l | EXPONENTIAL    |
| 2001 | te/lI/rI/kOd    | TELERECORD     |
| 2000 | lO/g@/rI/T@m    | LOGARITHM      |
| 2010 | wI/p@/sn&/p@    | WHIPPERSNAPPER |

Given a set of several such exemplars, it is possible for AM to guess the stress patterns for these words based on analogy with other related words. However, it was first necessary to slightly recode the dictionary entries to reflect the format needed for AM processing. Accordingly, the encodings were aligned so that syllables corresponded across the exemplars: **Figure 1** shows some sample exemplar feature vectors. Each feature is encoded as either the MRC phonetic symbol for each sound in the word, or else an ‘=’ sign, used for padding syllables. Each syllable was given two onset features, one nucleus feature, and two coda features. This resulted in a set of almost 6100 exemplar instances, each representing a four-syllable word. In **Figure 1**, each vector is preceded by its outcome—the stress pattern as specified in the MRC dictionary. The last column is simply a comment for user convenience.

This set of phonemically encoded exemplar feature vectors was compared by the AM system against several four-syllable input words to see what the prediction would be about their stress pattern. When the system was permitted to use all of the input instances, it performed with 100% accuracy. However, when the system was forced to consider input words without being able to retrieve previously-seen instances of the same word, it was still able to perform at an accuracy rate of just over 80% for four-syllable words. Another test with only three-syllable words indicated an even higher 87% accuracy rate.

To illustrate the effect on analogy on stress assignment, it is instructive to consider two test items, one of which the system got correct, and the other where it erred in its stress pattern assignment. In processing the word *candelabrum*, for example, it was correct in its assignment of the 1020 stress pattern; furthermore, it was 100%

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|      |                      |              |
|------|----------------------|--------------|
| 0200 | ==@==b&n===d@n==m@nt | ABANDONMENT  |
| 2000 | ==&==kjU===r@===sI== | ACCURACY     |
| 1002 | ==&==kw@===m@===rin= | AQUAMARINE   |
| 1020 | ==&b==dI===keI==S@n= | ABDICATION   |
| 2010 | ==&n==tI==tSeIm=b@== | ANTECHAMBRE  |
| 1002 | ==&===dI===p@U==sI@= | ADIPOCERE    |
| 0020 | =k0m=plI===keI==S@n= | COMPLICATION |
| 0120 | ==aI=dI@===lIs==tIk= | IDEALISTIC   |
| 1020 | ==In==f@===meI==S@n= | INFORMATION  |
| 0200 | ==In==fO===m@===tIv= | INFORMATIVE  |
| 0200 | ==In=fr&n=dZI===bl== | INFRANGIBLE  |
| 0200 | ==In=fri==kw@n==sI== | INFREQUENCY  |
| 0200 | ==In=fri==kw@n==tli= | INFREQUENTLY |
| 0200 | ==In=fjU@==rI===eIt  | INFURIATE    |
| 0200 | ==In=fju===z@===bl== | INFUSIBLE    |
| 1020 | ==In=fju===zO===rI@= | INFUSORIA    |
| 1020 | ==In=fju===zO===rI@l | INFUSORIAL   |
| 1020 | ==In=fju===zO===rI@n | INFUSORIAN   |
| 0200 | ==In=fju===z@===rI== | INFUSORY     |
| 2100 | ==In==g&===D@===rI9= | INGATHERING  |
| 0200 | ==In=greI==SI===eIt  | INGRATIAE    |
| 0200 | ==In=gr&===tI==tjud= | INGRATITUDE  |

**Figure 1.** Sample English AM feature vectors for four-syllable words.

confident in its judgment, meaning that other outcomes were not plausible. Since it is possible to examine the analogical set (i.e. the collection of other words that contributed via structural analogy to the outcome), we can examine exactly which words exerted an influence on the outcome.

We see in this case that the exemplar *candelabra* (the plural of *candelabrum*) contributed an influence of 95.99% to the 1020 outcome, which it shares with its uninflected test item counterpart. However, the two words have different endings. In this regard we note that another word, *simulacrum*, which also has a 1020 stress pattern but has an ending more similar to the test case *candelabrum*, also contributed slightly with 0.03% of an analogical effect.

Consider now the word *ruination*, which the system guessed (with comparatively low confidence) should be assigned a 1020 stress pattern, whereas in reality the pattern is 0020 (i.e. with no initial-syllable secondary stress). In this case close structural analogies *rumination* and *motivation* conspired to exert an influence on the outcome, suggesting their 1020 pattern.

It should be noted that in this small English stress-assignment task, we used only MRC phonetic information and syllable structure in the specification of the feature vectors. By employing richer feature vectors specifying other types of information such as the word's part-of-speech information and morpheme boundaries, results would probably be substantially improved.

Previous work has been done on stress assignment in other models involving connectionist, rule-based, and nearest-neighbor approaches. Stress assignment has also been successfully applied via the AM approach to Spanish (Eddington 2000). The next section gives details on how stress modeling was done for Lushootseed and Kalispel.

3. PROCEDURE. In developing exemplar and test data items for Lushootseed and Kalispel, a similar process was followed. First, in each language texts were found where stress was annotated; each consisted of transcripts of legends or stories told by tribal elders, recorded by linguists, transcribed, and subsequently published. Each word was extracted and converted to a romanized form, preserving the stress indications. These words were then processed by programs written in Perl to convert them to fixed-length feature vectors. For both languages the features were largely orthographic in character; no morpheme boundary or syllable alignment information was used.

3.1. ENCODING LUSHOOTSEED FEATURE VECTORS. The Lushootseed exemplars were taken from an 868-utterance, roughly 7500-word recounting of one elder's view on the history of the Puget Sound from the early period of white contact until present times (Hilbert 1995:7–57). Stress was annotated on many (but by no means all) of the words. Vectors of length 13 (i.e. having 13 features) were created for each word, sometimes with more than one vector per word. One vector was created for each vowel in the word, with the preceding and following letters creating left-hand and right-hand contextual features respectively. A vertical bar next to any given contextual vowel indicates that this vowel should be stressed. The outcome for each vector was whether the vowel which serves as its middle feature takes stress or not in that context: o for no stress, and p for primary stress.

For example, the word *tulčil* 'arrived' produces two exemplar vectors, one centered on the letter *u* and one centered on the letter *i*, which is stressed in the text:

$$\begin{array}{l} o, = = = = t u L C | i l = = , t u L C | i l \\ p, = = t u L C i l = = = = , t u L C | i l \end{array}$$

Note that stress is removed from the second vector's central feature; it is the outcome 'p' (for 'primary') at the far left that specifies to the system that the *i* should receive primary stress in this position. Unlike the English example above, each feature in the vector can involve more than one character; features are in this case delimited by spaces. **Figure 2** shows sample Lushootseed exemplar vectors.

3.2. ENCODING KALISPEL VECTORS. The Kalispel vectors were taken from 17 transcribed stories comprising about 5800 words (Vogt 1940:81–135). This yielded a total exemplar base of about 9600 instances. Again, each word was romanized and converted to one or more feature vectors, one built around each vowel in the word. In this case, the features were derived straight from the transliterated orthography, one

0 , = = = = h u y , = = = = , h u y ,  
 p , = = = = gW i h i t E b E xW , gW | i h i t E b E xW  
 0 , = = = gW | i h i t E b E xW = = , gW | i h i t E b E xW  
 0 , = gW | i h i t E b E xW = = = = , gW | i h i t E b E xW  
 0 , | i h i t E b E xW = = = = = , gW | i h i t E b E xW  
 0 , = = = = k W i = = = = = , k W i  
 0 , = = = = t u d s c | a p a ? , t u d s c | a p a ? ,  
 p , = t u d s c a p a ? , = = = , t u d s c | a p a ? ,  
 0 , u d s c | a p a ? , = = = = , t u d s c | a p a ? ,  
 p , u d xW s X T' a l' b , = = = , t u d xW s X T' | a l' b ,  
 0 , = = = = X qW u y' = = = = = , X qW u y'  
 0 , = = = = k W i = = = = = , k W i  
 0 , = = = = t u s d a ? s . = , t u s d a ? s .  
 0 , = = t u s d a ? s . = = = = , t u s d a ? s .  
 p , = = = = gW i h i t E b E xW , gW | i h i t E b E xW  
 0 , = = = gW | i h i t E b E xW = = , gW | i h i t E b E xW  
 0 , = gW | i h i t E b E xW = = = = , gW | i h i t E b E xW  
 0 , | i h i t E b E xW = = = = = , gW | i h i t E b E xW  
 0 , = = = = ? E = = = = = , ? E  
 0 , = = = = t i ? E ? = = = = , t i ? E ?  
 0 , = = = = t i ? E ? = = = = , t i ? E ?  
 0 , = = = t i ? E ? = = = = = , t i ? E ?  
 0 , = = t i ? E ? = = = = = , t i ? E ?  
 0 , = = = = c a p t a i n . = , c a p t a i n .  
 0 , = = c a p t a i n . = = = = , c a p t a i n .  
 0 , = c a p t a i n . = = = = = , c a p t a i n .

**Figure 2.** Sample Lushootseed vectors for the stress problem.

|               |               |               |
|---------------|---------------|---------------|
| n ____Li? e_? | n lixW_u_w iC | n mX e?iCEn'. |
| y __Li?e_? is | y W_u_wiCEn_L | n  e?iCEn'._k |
| y ? e_?istCEm | n _w iCEn_Lu? | y `._kWem't_C |
| n  istCEm,_kW | n CEn_Lu?esti | n m't_Cinnt e |
| y m,_kWem't_  | n n_Lu?estiy  | y Cinnte_n e_ |
| y em't_et' it | n u?estiy aqW | y t e_ne_p ul |
| y _ et'itS_Lu | y estiyaqWti_ | y n e_pulstEm |
| n itS_Lu?sq e | n  aqWti_sEmX | n  ulstEm_Lu? |
| y Lu?sqelixW_ | n Wti_sEmX e? | n tEm_Lu?nk'  |
| n sq elixW_u_ | y _sEmXe?iCEn |               |

**Figure 3.** Kalispel vectors.

character per feature. Five left-hand features represent the previous five characters (and/or underscores for a word boundary), and the five right-hand features represent the following five characters). The outcome for each vector is simply 'y' or 'n', specifying whether or not the feature in the middle should be stressed. **Figure 3** shows several sample Kalispel vectors.

4. RESULTS. Once the vectors were encoded, the data was presented to the system. Multiple trials were run for each language varying the number of exemplars, the length of feature vectors, and the content of the exemplar base. Several other technical parameters of the AM program were also tested in various configurations, but a discussion of the details would go beyond the scope of this paper. We briefly survey the results for each language in turn in this section.

4.1. LUSHOOTSEED RESULTS. Given the instance base mentioned above, the system achieves between 99%–100% when remembering all exemplars. However, when instances of the test item are discarded from the exemplar set so that the system is forced to posit an answer in the absence of explicit examples, the system still performs very well. In fact, the results consistently fall within an accuracy range of 92% to 95%.

The best results were obtained with a vector length of 13 features and an exemplar base of 7,600 words (which created about 15,000 exemplar vectors). Even with half the number of exemplars the system performance was still comparable. Interestingly, even when the exemplar base was created from an entirely different set of texts than those from which the test items were taken, performance was still in this accuracy range. Further work resulted in a slight improvement to 96%–97%; this was achieved by adding to the exemplar base several dictionary headwords from the definitive Lushootseed dictionary (Bates, Hess & Hilbert 1994), which are also annotated for stress.

Interestingly, several AM errors can be attributed to inconsistent transcription, within-speaker variation, and complicated morphological environments involving, for example, reduplication and lexical suffixes. Other errors included instances of English code-switching, interjections, and French loanwords.

4.2. KALISPEL RESULTS. Given the instance base for Kalispel data mentioned above, the system achieves 99.96% accuracy when remembering all exemplars. When test instances are removed from the exemplar base, the system still achieved 93.78% accuracy, assuming a vector length of nine features. Increasing the vector length to eleven features resulted in slightly better performance.

Leaving out one story from the collection of exemplars (an exclusion of about 12% of the total exemplars), and then testing the system on words from that excluded story, resulted in about 94% performance. In fact, using only 12% of the data for exemplars and testing on the rest of the stories (the other 88% of the words) still resulted in about 85.5% performance. These results also generalize well to other texts and therefore appear rather robust.

Again, erroneous results are interesting to analyze. Many of the errors occurred when lexical suffixes were added to roots. This is predictable, since it is arguably the most difficult area of Kalispel stress and as mentioned earlier, even humans do not understand the process well.

5. FUTURE WORK AND APPLICATIONS. While promising results have been obtained for both languages in this task, more work remains. For example, it is possible to improve

on the vector encodings by employing a better approach to representing secondary phonological features such as glottalization and labialization which are pervasive in the language. Aligning syllables as was done in the English example would also enhance performance for the Salish tasks, as would encoding morpheme boundaries.

This work can also be used to assess and document the consistency across various documentary sources for each language. For example, as more sources are analyzed it might be possible to find evidence for dialectal variation or variation within subjects and across subjects.

Also intriguing is the possibility of interpreting the analogical set to arrive at an account for some of the phenomena addressed. Since a complete description of stress phenomena (at least for Kalispel) has not yet been achieved, it may be possible to use AM to contribute to the understanding of such issues by a close examination of how the system assigns stress patterns and why.

There are several possible applications for implementations of stress modeling systems. Stress is a crucial yet all-too-rare component in text-to-speech systems, and modeling stress can add significantly to improving the suprasegmental properties of computer-generated speech. Similarly, speech recognition systems that take stress into account tend to have improved accuracy. Interactive computer-assisted language learning environments can provide instruction in correct stress placement for words from these languages.

Finally, the process of annotating and verifying glosses and transcriptions of recorded narratives and conversations is very important especially for the Salish languages, many of which are quickly disappearing.

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- <sup>1</sup> Note that two different phonemic representations are used in this document, each reflecting actual usage in the respective data sources used in this work. Thus in the MRC dictionary (and AM features derived from it) schwa is represented as @, whereas in romanized Lushootseed texts (and AM features derived from them) "E" is used for schwa. IPA symbols were not used in any data sources and hence are not represented in the figures showing actual data.
- <sup>2</sup> Romanization is the process of recoding graphological symbols from a language into the Roman (or Latin) alphabet that is used for English. Thus, for example, the Lushootseed word čəl is romanized in this paper as CEL.

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## RESOLVING AUTOMATIC PREPOSITIONAL PHRASE ATTACHMENTS BY NON-STATISTICAL MEANS

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PREPOSITIONAL-PHRASE ATTACHMENT is a topic of active research in the field of computational linguistics. Properly attaching prepositional phrases to their pertinent constituent proves straightforward for humans, but inferring these attachments in a cognitive modeling system becomes difficult. For example, in the sentence, *Ralph threw the frisbee to John*, the prepositional phrase *to John* will attach to the verb phrase *threw*. In another example, *Joe saw the dog with fur*, the prepositional phrase *with fur* will attach directly to the noun phrase *the dog*. Humans would have little difficulty resolving these examples, but for computers this is difficult.

The literature is replete with attempts at resolving ambiguities in prepositional-phrase attachment, but the vast majority of these endeavors use purely statistical methods (Hindle & Rooth 1993). However, statistical approaches are not appropriate or adequate in accounting for inferring prepositional phrase attachments in cognitive modeling systems, as human cognition is generally not a completely statistical process (Botterill & Carruthers 1999:191–207).

How, then, can PP attachments be determined in a natural language processing system based on cognitive modeling? This paper discusses three steps for accomplishing this task: syntactic modeling, lexicon construction, and semantic modeling. Syntactic modeling is achieved by establishing a syntactic representation. The second step involves building a lexicon that contains subcategorization information (i.e. part of speech, argument structure, etc.). This subcategorization information is then bootstrapped to infer whether the prepositional phrase should be attached to the preceding noun phrase or verb phrase. When increasing context shows an utterance untenable, it can be reanalyzed subject to constraints described in the psycholinguistic literature (Lewis 1993). Finally, a semantic model is created, which contains concept information from the lexicon, along with semantic relationships between the concepts.

This paper describes techniques that the authors have used to train NL-Soar to infer prepositional-phrase attachments during sentence processing. NL-Soar is a cognitive modeling architecture applied to natural language, which uses WordNet as its lexicon. WordNet is a machine-readable lexical database with over 100,000 entries, distributed by Princeton University (Fellbaum 1998). This lexicon has important subcategorization information for most of its entries, which is very useful in fashioning an architecture capable of ‘intelligent’ PP attachment. This paper discusses how the system performs PP attachment as well as reanalysis in garden path sentences.

1. OVERVIEW OF THE SOAR ARCHITECTURE. Newell and Simon (1982) presented the first version of the Soar cognitive modeling architecture, and Newell (1990) gives a detailed description of the system. Soar models human processing, attention, and memory, even down to psychologically viable memory distinctions between working, declarative, and procedural memory systems. Even so, Newell (1990:16) decided that language was, at the time, too difficult a task to attempt: 'Language should be approached with caution and circumspection. A unified theory of cognition must deal with it, but we will take it as something to be approached later rather than sooner'.

NL-Soar—the natural language implementation of the Soar architecture, was outlined in Lewis (1993) and was subsequently employed for use in modeling language behavior in several tasks including those of F-14 pilots in combat situations (Jones et al. 1999). The Soar research group at BYU presently works on NL-Soar (NL-Soar), and the current (7.3) version of NL-Soar represents syntactic parses as X-bar syntactic structures and semantic representations as lexical conceptual structures (LCS).

2. PREVIOUS WORK ON PP-ATTACHMENT. The vast majority of work in prepositional-phrase attachment has been done using statistical approaches to the problem. These statistical approaches generally involve analyzing large annotated corpora and determining the probability of an unknown attachment. The *Penn Treebank* (Penn Treebank) is an annotated corpus containing tags for part-of-speech along with skeleton syntactic and semantic parses. Computational linguists commonly use this and other corpora for training programs, which, in turn, provide a statistical probability for each potential attachment. For example, for the sentence, *I saw the man with the telescope*, a statistical parser might predict that the prepositional phrase (PP) *with a telescope* might have an 84% probability of attaching to the verb phrase (VP) *saw* and a 16% probability of attaching to the determiner phrase (DP) *the man*.

3. ASSUMPTIONS CONCERNING LANGUAGE AND COGNITION. Our approach makes two major assumptions about the nature of human language processing: (1) that the mental lexicon contains explicit subcategorization information and (2) that humans use this subcategorization information to prefer one syntactic attachment to another and we make such decisions using logical inference.

3.1. SUBCATEGORIZATION. The first of our major assumptions, that the mental lexicon contains subcategorization, is based on the widely accepted notion of thematic roles (also known as semantic roles, theta ( $\theta$ ) roles, etc.). According to Chomsky (1981), (1) verbs (events) assign thematic roles to nouns (entities), and (2) these theta-role assignments are predictable. For example, one sense of the transitive verb *prove* assigns (subcategorizes for) an actor theta role and a goal theta role, whereas a sense of the intransitive verb *vanish* subcategorizes only for an actor theta role, as illustrated in examples 1 and 2.

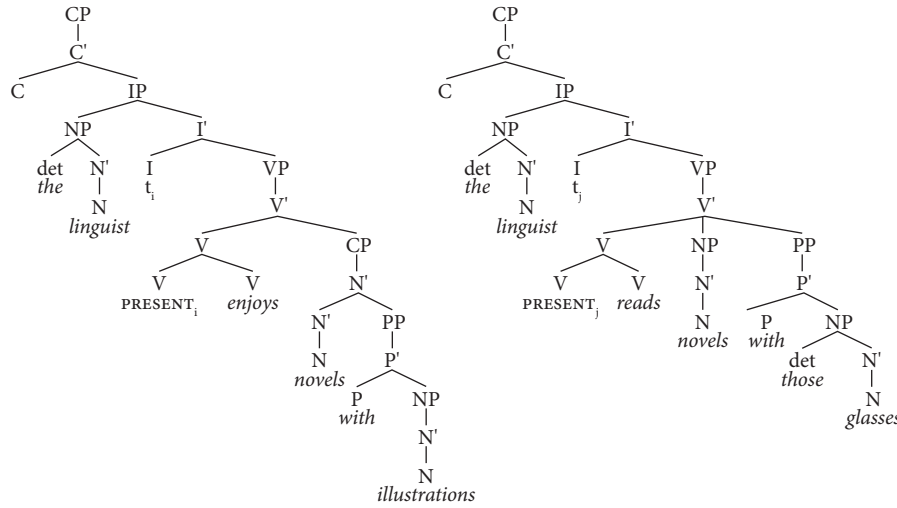
- (1) The mathematics professor proved this theorem.  
prove(Actor, Goal)  
prove(the mathematics professor, this theorem)
- (2) The book vanished.  
vanish(Actor)  
vanish(the book)

The WordNet lexicon applies the concept of subcategorization by assigning one or more subcategorization frames to each verb in the lexicon. Following are the verb frames that deal with prepositional phrases (PP). Notice that verb frames 15, 16, 17, 18, 19, 27, and 31 subcategorize for particular prepositions.

- 4. Something is —ing PP
- 15. Somebody —s something to somebody
- 16. Somebody —s something from somebody
- 17. Somebody —s something with somebody
- 18. Somebody —s something of somebody
- 19. Somebody —s something on somebody
- 20. Somebody —s somebody PP
- 21. Somebody —s something PP
- 22. Somebody —s PP
- 27. Somebody —s to somebody
- 31. Somebody —s something with something

This type of information is valuable for inferring syntactic attachments. For example, the verb *read* subcategorizes for two complements as in the sentence, *The linguist reads novels with those glasses*. In WordNet, *entice* is annotated with verb frame number 20 (and a few others), which requires a prepositional phrase as the second complement. The verb *enjoy*, on the other hand, subcategorizes for only one complement, which is illustrated in the sentence *The linguist enjoys novels with illustrations*. Examples 3 and 4 show the two sentences just mentioned, their potential argument structures, and the argument structure representations for the sentence.

- (3) The linguist reads novels with those glasses.  
reads(NP, NP, PP)  
reads(the linguist, novels) & with(reads, those glasses)
- (4) The linguist enjoys novels with illustrations.  
enjoys(NP, NP)  
enjoys(the linguist, novels) & with(novels, illustrations)



**Figure 1.** Two contrasting syntactic parses with an N-attached PP (left) and a V-attached PP (right).

These argument structures are realized syntactically as thematic-role assignment, and the contrasting syntactic structures are reflected in **Figure 1**.

3.2. MENTATION AND INFERENCE. This approach also assumes that humans determine syntactic attachments with learned rules (although we hope to integrate non-rule methods into our system in the future). For the present, we take this position for several reasons:

1. Declarative (rule-based) approaches account well for known causal relationships between belief, desire, and semantics.
2. Non-rule based approaches do not process at realistic rates to simulate the time course of human cognitive processing.
3. Many non-rule-based approaches require an unrealistic amount of training.
4. Connectionist approaches have difficulty accounting for cognitive adaptation to a dynamic environment.
5. Non-rule-based approaches cannot simulate sequential mental states, such as those required to bring about psychological affect.
6. Non-rule approaches cannot handle psychological reanalysis, such as belief reanalysis and syntactic reanalysis.

We will briefly address environmental adaptability, sequential mental states, and psychological reanalysis.

3.2.1. ENVIRONMENTAL ADAPTABILITY. An individual must possess mental representation and cognitive structure for acclimation to a constantly fluid environment. 'To get around in the world, a cognizer must keep track of enduring individuals that have changing, repeatable properties and relations. Doing this requires that mental predicates be applied to mental subjects, and it requires the capacity to apply predicates to subjects on a vast scale' (Horgan & Tienson 1996:10–11). Put differently, 'Humans (and other intelligent creatures) need to collect, retain, update, and reason from a vast array of information... There seems no way of making sense of this capacity except by supposing that it is subserved by a system of compositionally structured representational states' (Botterill & Carruthers 1999:196). Environmental adaptability is a central tenet of cognitive psychology, as human behavior depends on the ability of an individual to represent the world (Chomsky 1959) and to revise those mental representations through reanalysis (Peirce 1877).

The mentalist approach accounts for mental representation as a *language of thought* (LoT) comprised of mental propositions and rule-governed transitions between those propositions. Such an LoT is vital to the field of cognitive modeling in general and, more specific to this paper, the field of natural language modeling. In his seminal work, Newell (1990) outlines how an artificial intelligence *agent* can represent mental states and move between those states.

Newell (ibid:383) appeals to the Johnson-Laird theory (1983), which claims that mental representation of a concrete situation takes place by means of syllogisms, as seen below in a classic example.

- (5) a. Socrates is a man.  $\exists x[\text{Socrates}(x) \ \& \ \text{man}(x)]$   
       b. All men are mortal.  $\forall y[\text{man}(y) \supset \text{mortal}(y)]$

According to this paradigm, when an individual reads a syllogism s/he 'constructs an internal model of a concrete situation that the premises assert' (Newell 1990:383). Example (5) contains two premises: the major premise (a) and the minor premise (b). Several mental states are required for comprehension of how the major and minor premises relate: (1) the human or AI unit must have a *goal* of understanding the relationship between (a) and (b); and (2) once this goal state is realized, then *subgoals* are used to learn how the constituents of premise (a) relate to the elements of premise (b). These subgoals are described in section 4.2.2.

4.2.2. SEQUENTIAL MENTAL STATES. A central requirement for a cognitive modeling system is the ability to simulate sequential mental states. Many cognitive psychologists and philosophers argue that cognition is goal-directed and presupposes a logical progression between mental representations. The Soar architecture, as already mentioned, represents states using syllogistic logic, so it can denote the conditions of and associations between mental states. In the NL-Soar system morphology, syntax, and semantics are represented as separate but connected mental states. In fact, NL-Soar maps from the syntactic representation/state to a semantic representation/

state, as illustrated in the following example. We exclude the full syntactic parse in (7) because of length considerations.

- (6) The linguist enjoys novels with illustrations.
- (7) ...[<sub>VP</sub>[<sub>V'</sub>[<sub>V</sub>enjoys]] [<sub>NP</sub>[<sub>N'</sub>[<sub>N</sub>novels]]] [<sub>PP</sub> [<sub>P</sub>with][<sub>N</sub>illustrations]...]]]]...
- (8) enjoys(the linguist, novels) & with(novels, illustrations)

NL-Soar uses logic operators to map between the syntax (7) and semantics (8). Representing the syntactic and semantic states syllogistically and categorically allows NL-Soar to denote the transitions between those states.

On the other hand, non-rule theories such as connectionism can represent separate mental states, but cannot signify the transitions between them. An example demonstrates why. A neural network would represent the syntactic (7) and semantic (8) representations as different patterns of nodal activation; and it should, as these are distinct premises. So, to produce a mapping between these two distinct representations would be purely accidental, as there is no intrinsic association between the syntax and semantics in a non-rule system.

**4.2.3. PSYCHOLOGICAL REANALYSIS.** Generally, real-world premises are not clear-cut, and, because of this, humans frequently reanalyze situations when a more complete representation of the situation becomes available. Charles Sanders Peirce's essay *The Fixation of Belief* (1877) maintains that psychological reanalysis must proceed through three basic states: (1) previous belief (stored in memory), (2) doubt cast upon state (1), and (3) reanalysis of state (1) according to the new information in state (2) to arrive at a new belief state. Peirce's radical break from the long-held Cartesian view that decision processes must start with belief gave birth to the field of pragmatism and inspired psychologists and philosophers such as William James (especially in his classic essay *The Will to Believe*), Chauncey Wright, John Dewey, and Josiah Royce.

Clark and Clark (1977) and other psycholinguistic researchers have established the validity of psychological reanalysis in language. Lewis (1993) outlines many of these research studies and the ability of NL-Soar to deal with ambiguities through reanalysis, especially with respect to garden-path sentences.

Psychological reanalysis is conceptually similar to environmental adaptability and sequential mental states. Soar represents these states as syllogisms. When new information casts doubt on previous belief states, Soar can use this new information to reanalyze the previous belief state accordingly and generate an entirely new belief state. And, once again, since connectionist representation cannot intrinsically relate one logical state to another (because there are no logical states) any reanalysis that might occur is the product of absolute chance. This is a problem for connectionist, nearest neighbor, and analogical modeling approaches.

The following example illustrates the process of syntactic reanalysis in NL-Soar. NL-Soar parses the sentence *The magistrate accuses the terrorists from downtown of treason*.

NL-Soar parses *the* and lexical access (from WordNet) returns *the* annotated as a determiner. The procedure continues with *magistrate*, which returns from lexical access annotated as a plural noun (morphology is a separate process, which we do not describe in this paper). With two lexical items and their categories, the agent must decide how the items relate syntactically. It then draws upon phrase-structure rules, encoded in the system, to determine the possible syntactic relations between determiners and nouns, and the corresponding structure is built. Under X-bar syntactic theory, *the magistrate* is constructed under a noun phrase (NP) headed by the noun *magistrate*, as illustrated in (9).

- (9)  $[_{NP}[_{N'}[_{det} \text{the}] [_{N} \text{magistrate}]]]$

After this NP is successfully built, NL-Soar waits for the next word, *accuses*. WordNet stores *accuses* unambiguously as a verb (the lemma being *accuse*), so *accuses* is annotated as a verb (*accuses.v*). With this much information, the system builds a VP for *accuses*.

- (10)  $[_{VP}[_{V'}[_{V} \text{PRESENT}_i] [_{V} \text{accuses}]]]$

This VP is then linked to the preceding NP under an IP node (and a CP node).

- (11)  $[_{CP}[_{C'}[_{IP}[_{I'}[_{VP}[_{NP}[_{N'}[_{det} \text{the}]] [_{N} \text{magistrate}]]] [_{I} i] [_{VP}[_{V'}[_{V} \text{PRESENT}_i] [_{V} \text{accuses}]]]]]]]]]$

When lexical access occurs for *accuses*, two of the verb frames that return from WordNet are frames 18 and 20, repeated here for convenience.

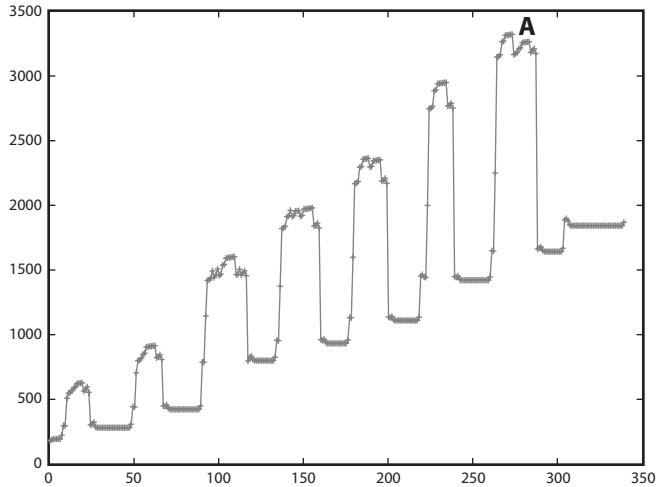
18. Somebody —s something of somebody  
20. Somebody —s somebody PP

So *accuses* is annotated as a verb with two complements. The first complement is a noun phrase and the second complement a prepositional phrase headed by the preposition *of* or another preposition. After the structure is built in (12) and a brief wait period, *the*, then *terrorists* are parsed into a noun phrase similarly to *the magistrate* and linked to the V as the first complement of *accuses*.

- (12)  $[_{NP}[_{N'}[_{det} \text{the}] [_{N} \text{terrorists}]]]$   
(13)  $\dots[_{VP}[_{V'}[_{V} \text{accuses}]][_{NP}[_{N'}[_{det} \text{the}]][_{N} \text{terrorists}]]]]]\dots$

Following *the terrorists*, NL-Soar parses the preposition *from*, which fits into the general preposition slot in the second complement position. Since such a syntactic link is acceptable, the link succeeds and the corresponding structure is built.

- (14)  $\dots[_{VP}[_{V'}[_{V} \text{accuses}]][_{NP}[_{N'}[_{det} \text{the}]][_{N} \text{terrorists}]]] [_{PP}[_{P'}[_{P} \text{from}]] [_{N} \text{downtown}]]]]]\dots$



**Figure 2.** Working memory processing in NL-Soar.

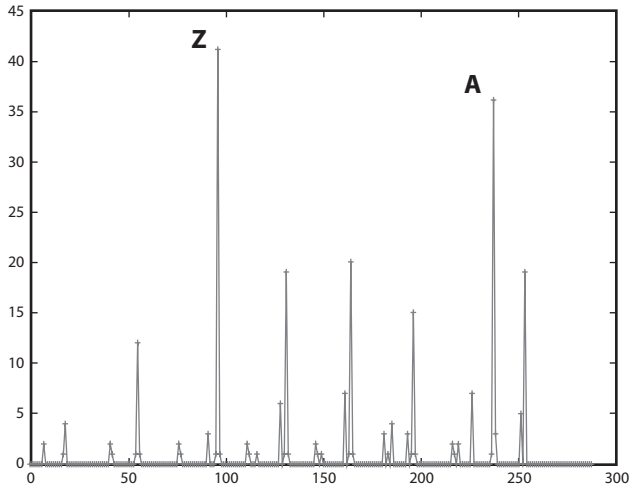
Notice that this construction is incorrect, but it is allowed at this point because the subcategorization permits it. Fortunately, the Soar system, as already described, is capable of reanalysis, and this is precisely what happens when the next prepositional phrase *of treason* is parsed.

When *of treason*, enters working memory, as with all of the other words in the sentence, a rule (operator) is proposed to learn what to do with this new phrase (*of treason*). There are two possible syntactic decisions at this point: (1) adjoin *of treason* to the N' governing *downtown* or (2) link *of treason* into the second complement slot of *accuses*. In this situation, NL-Soar prefers the second choice (link this prepositional phrase into the second complement slot of the verb), because, as already mentioned, *accuses* specifically subcategorizes for the preposition *of* but not *from*. In order for this to occur, the previous linkage between *from* and the *accuses* must be snipped and the new syntactic structure is remade. *From downtown* becomes an adjunct of *terrorists* and *of terrorism* becomes the second complement of *accuses*.

- (15) ...<sub>VP</sub>[<sub>V</sub>'[<sub>V</sub>[<sub>V</sub>accuses]][\_NP[\_N' [...[\_<sub>det</sub> the][\_N terrorists]]]]]  
       [\_<sub>PP</sub>[\_P' [...[\_P of][\_N terrorism]]]]]...

As already mentioned, Soar learns in order to accomplish goals and models working memory. **Figure 2** illustrates the working memory processing that occurred in comprehending the sentence *The magistrate accuses the terrorists from downtown of treason*. The x-axis shows the time course for processing the sentence and the y-axis represents the number of active items in working memory. The peaks on the graph correspond to syntactic linking of constituents into the tree, while the troughs are periods when NL-Soar waits for the next word to enter the phonological buffer. Peak





**Figure 3.** Learning in NL-Soar.

**A** reflects the point at which the syntactic reanalysis takes place. Notice that this is the highest point on the graph, meaning that working memory is taxed maximally at this point.

The type of information in **Figure 2** has been verified as hippocampal population spikes in research on rats, mice, and macaque monkeys. These population spikes look quite similar to what is observed in **Figure 2**. This type of pattern cannot be verified in human working memory (generally, the medial-temporal lobe structures), however, as this type of imaging is only available through insertion of electrodes—a practice that, fortunately, is not considered ethical.

**Figure 3** reflects the learning that NL-Soar uses in parsing the same sentence as the previous figure. The x-axis is the time course of processing, and the y-axis represents the use of previously learned items in parsing the sentence. Once again, point **A** on **Figure 3** is the position at which the syntactic reanalysis occurs. Point **Z** (the highest point on the graph), on the other hand, represents linking of *the terrorists* into the syntactic tree. The spike is high at this point because NL-Soar has previously learned how to link in the noun phrase *the magistrate* and this learning is used at this point, which makes the process of linking *the terrorists* faster than any other syntactic linkage.

**4.3. THE PLACE OF NON-RULE THEORIES IN LANGUAGE PROCESSING.** This is not to say that non-rule approaches (connectionism, nearest neighbor, analogical modeling, and other non-rule theories) have no value in a cognitive theory/architecture. Marr (1982) describes three possible levels of cognitive representation. The top level concerns itself with reallocation of attention between mental processes. The middle level represents the actual mental states (premises) and their transitions, which we have described in some detail already. The lowest tier of representation physically

implements state transitions. He (and Botterill & Carruthers 1999:197) suggests that non-rule theories might be useful at the lowest level, but should not be applied any higher.

Non-rule models might be implemented in Soar at this lower level by, for example, using it to decide between two (or more) equally preferred rules. Another possible application would be to use analogical modeling for morphological processing. In fact, an interesting experiment would be to compare analogical modeling (a non-rule approach) and finite state modeling (a rule-based approach) for morphological processing in NL-Soar.

6. CONCLUSION AND FUTURE WORK. Resolution of prepositional-phrase attachment is still an open issue in natural language processing. This paper has illustrated the usefulness of using a cognitive modeling system that utilizes subcategorization information in order to infer attachments. Using NL-Soar to model language comprehension and generation is a step in the right direction to understanding how humans process language. The method outlined in this paper—using subcategorization to infer syntactic prepositional phrase attachment—is useful for deciding other types of syntactic attachment such as complementizers, infinitivals, etc.

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# AUTOMATICALLY EXTRACTING PREDICATE-ARGUMENT STRUCTURES FROM NATURAL LANGUAGE TEXTS

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GOOGLE CURRENTLY SEARCHES 3,307,998,701 web pages millions of times a day (Google 2003). More and more people are accessing huge amounts of electronic data and are becoming increasingly dependent on being able to understand the information being accessed. Due to the increase in computing power, textual analysis and understanding has become an important problem that is currently being worked on in the area of natural language processing (NLP).

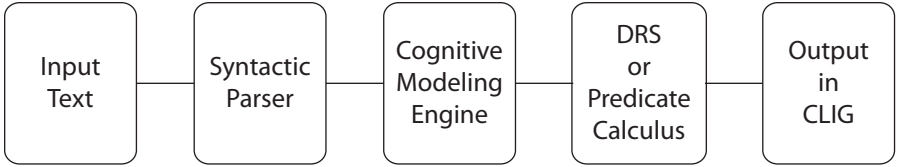
As electronic texts have become more available to researchers, they have come to face a two-fold problem. On the one hand, they must be readable to the general population of users; as such, they must be written in a way that is understandable to humans, which means being written using natural language techniques that follow the conventional syntactic and semantic rules of a given natural language. On the other hand, the sheer amount of information available is becoming increasingly overwhelming. While not all of the textual information available electronically is worth the effort, researchers are becoming increasingly concerned about the problem of indexing the valuable information and making it more readily accessible to those interested.

The ability to extract predicate-argument structures from text has increased in importance in various fields beyond linguistics. By being able to extract this type of information, researchers have been able to develop question-answer systems, intelligent tutoring systems, and web-based search and retrieval systems. The medical domain has especially benefited from this type of research. The type of information being extracted in the medical field, however, has mostly been limited to extracting domain-specific relationships, such as protein-to-protein interactions (Wong 2001) and gene relations (Stephens et al. 2001). While these systems have proven valuable, they are limited to extracting information contained in these specific types of relationships. These approaches are not able to process more complex types of textual input.

This paper presents LG-Soar<sup>1</sup>, a system that is able to handle more complex natural-language texts and describes how the system is able to extract predicate-argument structures from these texts. In order to demonstrate how this process works, two types of input text have been chosen: newspaper headlines and (in)eligibility criteria for medical clinical trials.

## 1. NATURAL LANGUAGE TEXTS.

1.1. NEWSPAPER HEADLINES. Newspaper headlines are meant to condense the information in a news story and represent it as concisely as possible. They are meant to



**Figure 1.** LG-Soar predicate-argument extraction process.

be short, catchy, and informative. These requirements significantly impact how the headline is formatted. For example, determiners are usually omitted and contextual information is often left out. Changes like these sometimes lead to ambiguities, both structural and lexical, and a parser must be capable of dealing with these.

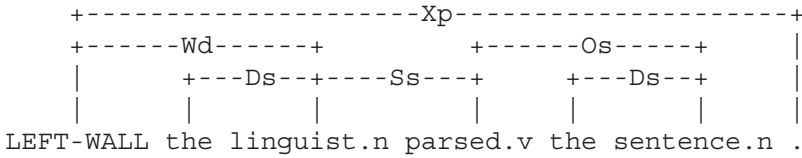
**1.2. ELIGIBILITY CRITERIA FOR MEDICAL CLINICAL TRIALS.** The second type of textual information this paper focuses on is (in)eligibility criteria for medical clinical trials. Clinical trials are used by medical professionals as a tool for recruiting patients to undergo new treatments or receive experimental medications. The U.S. government sponsors a website which contains a listing of clinical trials and this website is located electronically at [www.clinicaltrials.gov](http://www.clinicaltrials.gov). This repository of trials currently lists about 8,800 studies which are sponsored by various organizations including the National Institutes of Health, other federal agencies, and private industries (National Library of Medicine 2003). Each trial or study in the repository is divided into four different sections: Purpose, Eligibility, Location and Contact Information, and More Information.

The research presented here is concerned with the information located specifically in the Eligibility section. As indicated by the name, this section contains a listing of the requirements that a given patient must adhere to in order to participate in the trial. Depending on the trial, this section can contain eligibility criteria, ineligibility criteria, both types, or only one of the types.

**2. TOOLS.** Various components work together to form the structure of the LG-Soar logical structure extraction system. First, a natural-language parser parses out the incoming text. A cognitive modeling engine then processes the output given by the parser to identify the parts of the text which compose the corresponding predicate-argument structure. Both first order predicate calculus and Discourse Representation Structures are used as output. This output is then graphically represented in CLIG, a linguistics grapher. The entire process is outlined in **Figure 1**.

The following sections provide a brief overview of each of the tools used and the reasons why they have been chosen for this system.

**2.1. LINK-GRAMMAR PARSER.** The first step in the LG-Soar system is feeding the input text through a shallow syntax-to-semantics parser. This system uses the Link-Grammar Parser, a syntactic dependency parsing engine (Sleator 1993). Unlike typical tree-structure parsers common in linguistics, syntactic dependency parses are



**Figure 2.** A parse of the sentence "The linguist parsed the sentence".

motivated by individual word relationships. Links connect individual words together by adhering to certain constraints which determine grammaticality. These constraints are as follows:

- I. **Planarity:** Links of an utterance cannot cross.
- II. **Connectivity:** Links of an utterance must indirectly connect all the words together.
- III. **Satisfaction:** Correct links must be used to connect the words of an utterance together.

These three constraints work together to parse out textual input. An example of how these constraints work together to accomplish this can be seen in **Figure 2**.

As shown in **Figure 2**, the links generated by the parser give clues regarding the relationships between the individual words in the text. For example, the *Ss* link connects the subject of the sentence to the verb and the *Os* link connects the verb to the object. In total, the parser has 107 different major links, with each of these links containing various sub-linkages.

The link-grammar parser proves extremely beneficial in the LG-Soar extraction system. One benefit is the speed of the parser. It is written in the C programming language and can run through high volumes of text without substantial delay. Another benefit is its robustness. The parser makes intelligent guesses about how to link words not included in the parser's dictionary. Misspellings can also be processed. The link-grammar parser comes packaged with an API so it can be easily integrated with other applications. Finally, the system can be freely downloaded for academic and research purposes at <http://bobo.link.cs.cmu.edu/link>.

**2.2. SOAR ARCHITECTURE.** The ability to identify and output predicate-argument structures from text is a complicated task that involves more than the ability to parse the incoming information. It is necessary to be able to understand the information that is being parsed. Some systems do this by filling in predetermined templates of information about the domain in which they are working. In essence, they do regular expression pattern matching on the text to find information they know they are already looking for. The LG-Soar system does not already know what it is looking for in the text that it analyzes and so it has to rely on the syntactic cues given by the parser in order to make semantic sense of the utterance in order to output the corresponding predicate-argument structure.

In order to accomplish this next step, LG-Soar uses a cognitive modeling architecture to translate the parsed sentence into the corresponding output structures. The architecture it uses is Soar, a theory and system designed to model human cognitive processing (Newell 1994 *passim*). Researchers have used Soar to model and process various types of data, but in order to be able to process the output from the Link-Grammar parser, it was necessary to add some functionality to the basic Soar architecture.

First of all, the concepts in the particular utterance need to be identified. The concepts are then matched up with their corresponding variables based on cues supplied by the syntactic parser. Once the variables and concepts are matched up, the predicates and their individual arities are determined and the arguments are matched to the corresponding predicates.

Soar provides a flexible multipurpose platform which includes the following benefits:

1. Goal-directed problem solving
2. Agent-based architecture
3. Proven in other applications
4. Ability for learning

Soar was chosen as an integral part of this system for two very important reasons. First, its successful track record among researchers in the field of artificial intelligence programming and cognitive processing is widely known. Many applications have been and are continually being created which use Soar as a cognitive architecture to approximate and model language use. Using Soar in these types of applications has proven successful because it is agent-based and also because of its goal-directed processing. The above-mentioned benefits, which have added increased functionality to different types of applications, are things that can be leveraged to add functionality to the LG-Soar system as well.

**2.3. FIRST-ORDER PREDICATE CALCULUS.** LG-Soar uses two representation formalisms. The first is first-order predicate calculus (FOPC). FOPC is a formalized way of representing semantic information about the world. Many benefits of FOPC make it an ideal candidate for representing parsed-utterance output in LG-Soar. One benefit is that because FOPC is a formalized language, computer languages have been developed to process FOPC forms. Prolog is a good example of a computer language that does this. Once the output from LG-Soar is represented in FOPC, the representation can be fed into another application which accepts FOPC input and produces interesting results. Prolog has the ability to perform inferencing and query matching. By utilizing these tools, researchers can create applications that infer relationships about data they are receiving as input, and to also be able to ask questions of the data and receive answers that are not necessarily explicit in the data. Another benefit of FOPC is that it can be used crosslinguistically.



2.4. DISCOURSE REPRESENTATION THEORY. LG-Soar uses an additional formalism besides FOPC for representing the parsed-utterance output. This formalism is based on a theory called Discourse Representation Theory (DRT) (Kamp 1993 *passim*). DRT is a formal theory for describing semantic and pragmatic relationships within single utterances as well as across utterances. Not only does it describe the relationships which exist, but it goes beyond that with mechanisms that represent higher-level linguistic information such as tense and aspect.

LG-Soar uses the structure proposed by DRT, a discourse representation structure, or DRS. A DRS also has certain benefits to the system. First, DRSs are visually easier to read than other types of output. Secondly, DRS output can be translated into FOPC. DRT was designed in a way to specifically allow this translation to occur in both directions, increasing its functionality. This is especially important with clinical trials eligibility criteria where initial DRSs are translated into FOPC so they can be used as input for medical applications.

2.5. CLIG. CLIG (Computational Linguistics Interactive Grapher) is a program designed to represent various types of linguistic structures. CLIG can be readily integrated into other programs where different linguistic utterances can be represented and viewed. The grapher can display X-bar trees, discourse representation structures, feature-value structures, or a combination of these. Users can also add interactive hyperlinks and buttons to the output.

While CLIG output is not ideally formatted for all computational applications, it has its benefits. First, it is easy to see the representation of the parsed utterance, and hence is beneficial for testing and debugging. When a sentence does not parse correctly, it is easy to see where the parse failed by looking at the CLIG output. The incorrect parse can then be tracked back to where the error occurs in the LG-Soar code. When newer syntactic structures are being programmed in LG-Soar, CLIG is useful to see how the current system treats the utterances, thereby testing what needs to be done if anything to correct the representation.

3. RESULTS. As mentioned above, LG-Soar is capable of extracting predicate-argument structures from natural-language text. This next section shows how LG-Soar is able to take complex natural language and extract the corresponding logic structures.

3.1. EXTRACTION EXAMPLES. One type of text this system currently handles is newspaper headlines. **Figure 3** (overleaf) shows sample newspaper headlines and the corresponding outputs generated by LG-Soar.

**Figure 4** (overleaf) is another example of how LG-Soar is able to process different types of text, namely eligibility criteria for a medical clinical trial titled 'Novel Adjuvants for Peptide-Based Melanoma Vaccines'.

4. CONTRIBUTIONS. The goal of this project is to create a system capable of robustly extracting logical structures from natural-language texts. Besides integrating the var-

Grenade attack kills U.S. soldier in Iraq

|                   |
|-------------------|
| x y               |
| grenade attack(x) |
| U.S. soldier(y)   |
| iraq(z)           |
| in(y,z)           |
| kills(x,y)        |

grenade attack(x) & u.s. soldier(y) & iraq(z) & in(y,z) & kills(x,y).

Wall Street analyses routinely inflate stock prices

|                         |
|-------------------------|
| x y                     |
| wall street analysts(x) |
| stock prices(y)         |
| inflate(x,y)            |
| routinely(inflate)      |

wall street analysts(x) & stock prices(y) & inflate(x,y) & routinely(inflate).

**Figure 3.** Logic output (discourse representation structures and FOPC forms) for two news-paper headlines.

|                                                                                                                                                                                                         |                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Inclusion Criteria:</b></p> <p>Ages Eligible for Study: 18 Years and above</p> <p>Genders Eligible for Study: Both</p> <p>Diagnosis of stage III or IV cutaneous, mucosal, or ocular melanoma</p> | <p>age(Person,X) &amp; X &gt;= 18.</p> <p>gender(Person,X) &amp; (female == X    male == X).</p> <p>diagnosis(Person,X) &amp; melanoma(X) &amp; type(X,Y) &amp; (cutaneous(Y)    mucosal(Y)    ocular(Y)) &amp; stage(X,Z) &amp; (Z == 3    Z == 4).</p> |
| <p><b>Exclusion Criteria:</b></p> <p>Steroid therapy</p> <p>Allergic reaction to Montanide ISA 51</p> <p>Positive for hepatitis B, hepatitis C, or HIV</p>                                              | <p>¬(therapy(Person,X) &amp; steroid(X)).</p> <p>¬(allergy(Person,X) &amp; montanide ISA 51(X)).</p> <p>¬(condition(Person,X) &amp; hepatitis B(X)    hepatitis C(X)    hiv(X)).</p>                                                                     |

**Figure 4.** Eligibility criteria (both inclusion and exclusion) for a clinical trial.

ious components and getting them to work properly together, this work involved increasing the robustness of the system to handle a multitude of syntactic structures. The following is a non-exhaustive list of the types of structures currently implemented in LG-Soar:

- Transitivity
- Intransitivity
- Imperatives
- Negation
- Definiteness
- Indefiniteness
- Modals
- Nominal compounds
- Modification
- Prepositional phrase attachment
- Relative clauses

As mentioned above, many fields of research that deal with increased amounts of data are becoming more and more interested in identifying ways to extract predicate-argument relationships from textual input. One current use focuses on using the predicate-argument structures from medical clinical trials generated by LG-Soar as input to a system that matches up patients to clinical trials for which they are eligible by comparing the data contained in patients' medical records to the predicates extracted from clinical trials.

5. FUTURE WORK. While this project has indeed shown that it is possible to extract robust logical structures from texts, additional work is necessary to improve the current system. One area of improvement is increased syntactic coverage, such as improved processing of conjunctions and anaphoric constructions. Other types of structures not currently implemented in the system need to be identified so that LG-Soar can be programmed with added this added syntactic functionality. Another area of improvement is in terms of semantic processing. Additional semantic functionality can be added to the system by using higher-order predicate logic instead of current FOPC used in the system. As mentioned earlier, FOPC allows for representing semantic relations between individuals. However, higher-order logic goes beyond simple individual relations and allows for representation of relations, which increases the types of semantics that can be represented. Pragmatic information added to LG-Soar would also greatly increase its usefulness by increasing the amount of information the system gives the user about the text being processed, which could even include information that is not explicitly stated in the text. Pragmatic information can usually be found in different domain-specific ontologies or knowledge sources and which in the future will be added to the system. Two knowledge sources that would be useful to integrate into the system are WordNet and UMLS. WordNet is an ontology of general world information that is divided into hierarchical groupings. Information about WordNet can be found at [www.cogsci.princeton.edu/~wn/](http://www.cogsci.princeton.edu/~wn/). UMLS (Unified Medical Language System) is a series of medical knowledge sources useful for researchers in the medical field. Information about this can be found at <http://www.nlm.nih.gov/research/umls/>.

6. CONCLUSION. The goal of LG-Soar is to extract robust logical structures from natural-language texts. This paper focuses on various tools used in the LG-Soar extraction system, along with the method used to convert natural-language text into predicate-argument structures. This paper has also shown how the system can deal with two very different types of more complex textual information, namely newspaper headlines and (in)eligibility criteria for medical clinical trials, and the subsequent syntactic structures found in each type of text. By no means is the system perfectly capable of extracting logical structures from every textual medium; however, the robustness, speed, and ease of integration of the system make it an ideal choice for outputting logical structures from natural language.

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<sup>1</sup> Research funded by the National Science Foundation.

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# ONTOLOGY PROCESSING AND THE AUTOMATIC INTEGRATION OF DICTIONARY DATA FROM MULTIPLE SOURCES

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WE HAVE BEEN EXPLORING possible methods for integrating various electronic dictionaries into a unique dictionary database which can provide broad and detailed coverage of linguistic features. To this end, we have succeeded in building a plug-in architecture for handling dictionary information and making the data accessible over the web. Possible applications include an on-line dictionary data retrieval tool for language learners and professionals. Users will be able to

- retrieve dictionary data for Chinese/English words and phrases as they would with a conventional dictionary;
- retrieve entries matching syntactic and/or semantic criteria provided by the user.

This dictionary database will also serve as a resource for a variety of natural language processing applications. For example, the dictionary database developed for this project is being used in connection with the dictionary management phase of an ongoing project looking into the example-based machine translation of legal texts.

1. **DICTIONARY RESOURCES.** Currently the dictionary database represents the combined data from several dictionary resources, incorporating both English and Chinese language dictionary data. Since dictionaries are designed and produced for different purposes, they often organize and structure their entries differently.

For example, as illustrated in **Figure 1** (overleaf), every entry (*EEntry*) in the Collins Cobuild dictionary has three relations, or properties:

1. *HasHWSE* (HeadWord Super Entry), which specifies the different usages of the entry;
2. *HasHWME* (HeadWord Main Entry), which captures the morphological information related to the entry, such as, pronunciation, inflected or alternative form as well as cross-reference; and
3. *HasEMeaning* which indicates the meaning of the entry with definition and examples.

The actual instances of *E(nglish)Meaning*, i.e. definition and examples, for 'A' in Collins COBUILD are shown in **Figure 2** (overleaf).

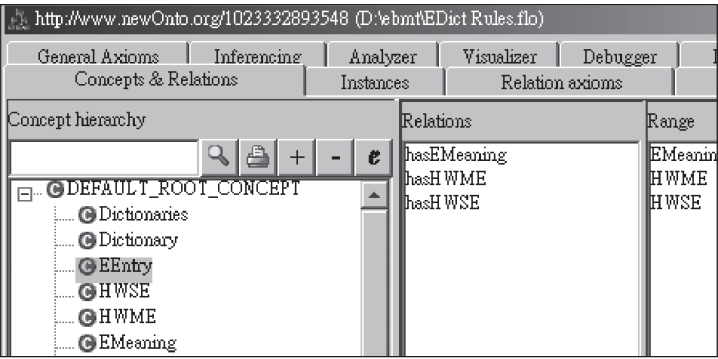


Figure 1. Collins COBUILD ontology in OntoEdit.

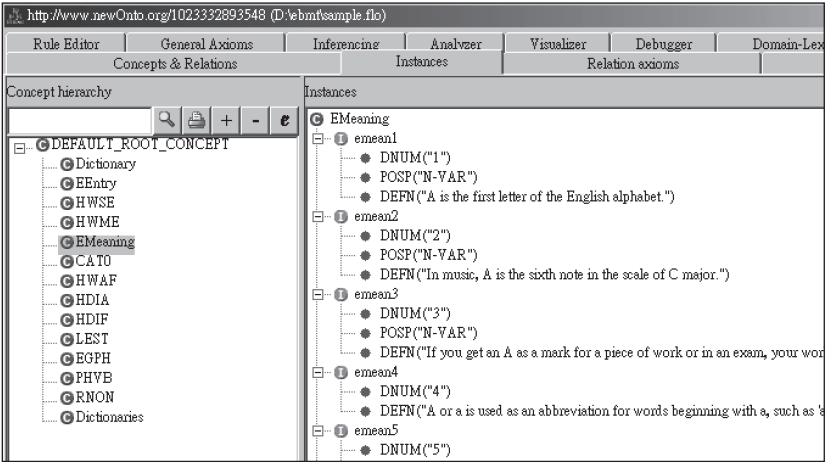


Figure 2. Instances of E(nglish)Meaning for 'A' from Collins COBUILD.

The structure of another dictionary, this one a Chinese language dictionary, is shown in **Figure 3**. In the conceptual hierarchy shown in this figure, *ChineseMeaning* is a child of the *Meaning* element, and thus inherits the properties of the *Meaning* element, i.e. those which are shaded, *hasDefinition*, *hasExample*, etc., along with those properties specific to itself, namely, *hasModifier* and *hasPartOfSpeech*.

The actual data from this dictionary is organized according to the design shown in **Figure 3**. Instead of showing it as it would appear in OntoEdit, we have represented it below using F(rame)-Logic notation. F-Logic is one way of representing the output from OntoEdit. F-Logic is described as ‘...a database logic which accounts in a clean and declarative fashion for most of the “object-oriented” features such as object identity, complex objects, inheritance, methods, etc.’ (Kifer et al. 1995). Using F-Logic, linguistic data may be encoded in a machine-readable format from which inferences

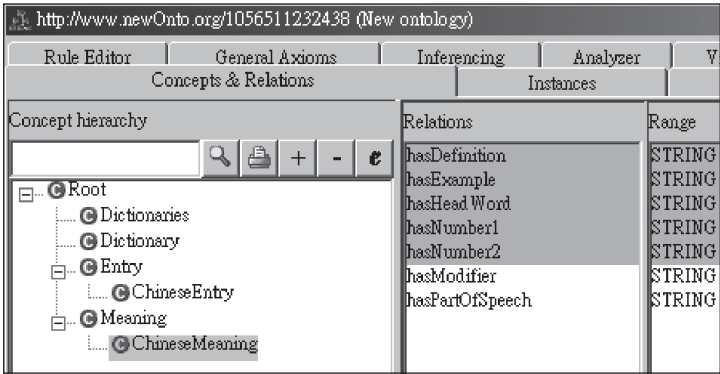


Figure 3. Modern Chinese Dictionary ontology in OntoEdit.

can be computed about the structure and meaning of the dictionaries through the application of different axioms.

The first line indicates that *Entry*<sub>1</sub> is an instance of the concept *ChineseEntry*; the next few lines list its attributes/relations and their values, e.g. *hasCanonicalForm*->>“阿”, etc. Similarly, *cmean*<sub>1</sub> is an instance of the concept *ChineseMeaning*; and its attributes/relations and their values are also given.

```
entry1:ChineseEntry.
entry1[hasCanonicalForm->>“阿”].
entry1[hasPronunciation->>“a1”].
entry1[hasMeaning->>cmean1].
entry1[hasMeaning->>cmean2].
cmean1:ChineseMeaning.
cmean1[hasDefinition->>“前綴。用在排行、小名或姓的前面，有親昵的意味”].
cmean1[hasExample->>“～大～寶～唐 ”].
cmean1[hasHeadword->>“阿”].
cmean1[hasModifier->>“方”].
cmean1[hasNumber1->>“1”].
```

Using OntoMap in OntoEdit (see **Figure 4**, overleaf) we can map these dictionary-specific structures to a model based on the industry-supported OLIF specification, whose entries have both *central* information, referring to definition features and administrative features; and linguistic information, including morphological, syntactic and semantic features.

At present, one may query a specific data resource, but as pointed out above, by unifying these dictionary sources according to the OLIF specification, we will be able to write a single set of queries to target all data sources. Users may access the information over the web, as illustrated by the screen shot shown in **Figure 5** (overleaf).

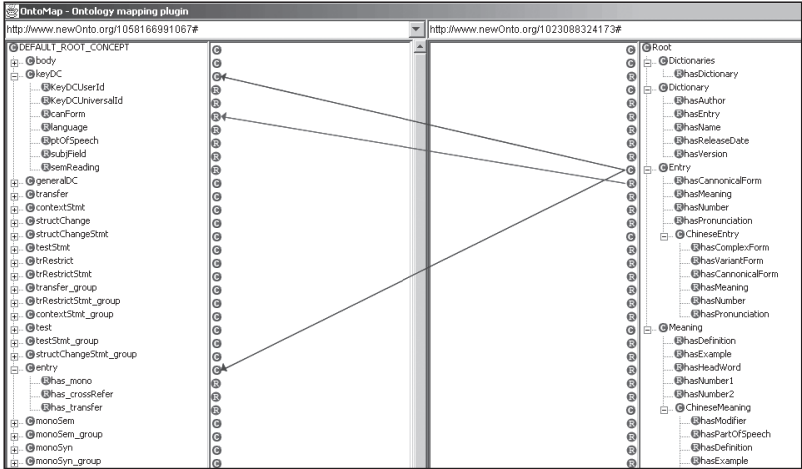


Figure 4. Using OntoMap to map between OLIF and Modern Chinese Dictionary ontologies.

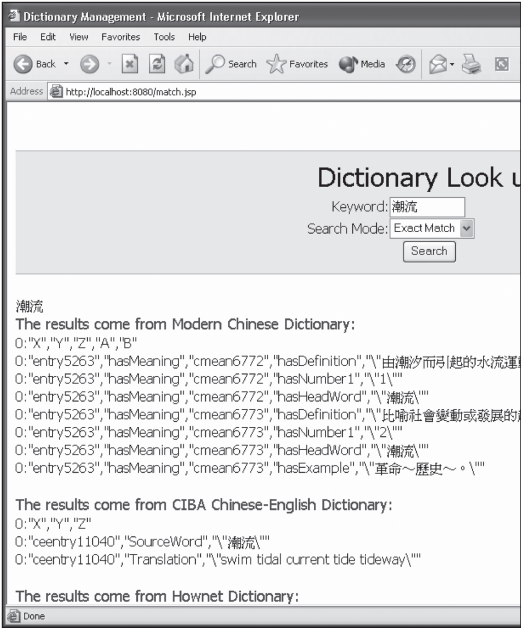
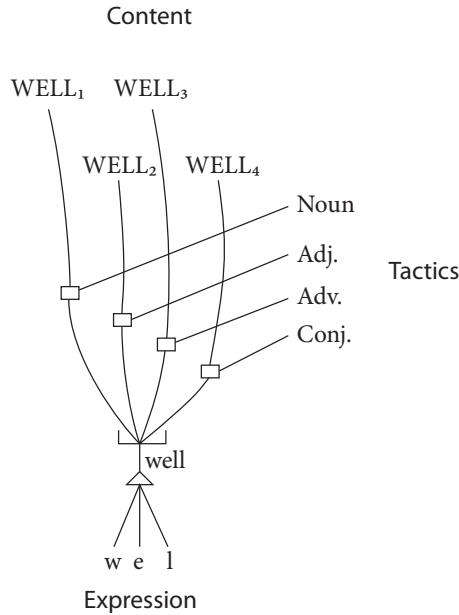


Figure 5. Screenshot of online web access to dictionary data.

2. WORDS AS LINGUISTIC INFORMATION. The dictionary data drawn from these various resources represents both lexemic and sememic information and must be able to relate to the lexico-grammatical, semantic and conceptual systems of language. We have adopted a network approach, also modeled in OntoEdit, for describing not only





**Figure 6.** Network diagram for well.

dictionary data, now unified according to the OLIF standard, but also other linguistic information at other levels including lexico-grammatical, semantic and conceptual.

What is a word? As Sydney Lamb (1969) points out, there is the morphological word or *morpheme*, the lexical word or *lexeme*, and the semantic word or *sememe*. Describing the role of the lexeme in the information system, Lamb (1974) writes, 'Every lexeme has its connection to the grammatical tactics. And it connects downwards to expression in some cases as a simple connection; e.g. the lexeme *dog* coincides with the morpheme *dog*. Others are more complicated; e.g. *German-shepherd* connects to the combination of morphemes *German* and *shepherd*. And then any lexeme connects upwards to the sememic or conceptual system.' This same idea is represented graphically in the network diagram for the lexeme *well* shown in **Figure 6**.

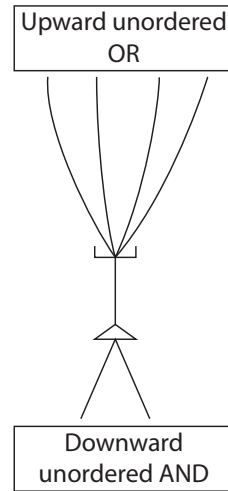
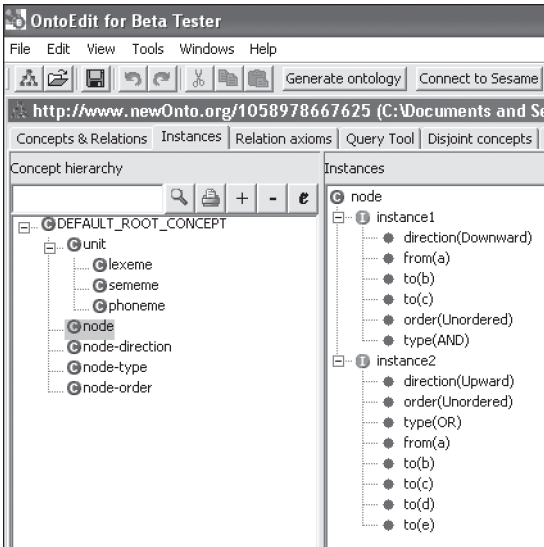
Elaborating further on the nature of the information system, Lamb (1974) states:

Going on with the characterization of the information system, one could think of it in sort of loose terms as like a clump of trees, where each tree is one of these of modalities, and the branches of the different trees *interconnect* with one another. For the language tree the lower end would be the expression and the higher end would be the content or what we can call the network of concepts. The analogy with a tree is helpful within any of the modalities; as you go higher, i.e., more abstract, you find larger and larger inventories. For example, the number of morphemes in a language is quite large in comparison with

the number of phonemes, and the number of lexemes is even greater. There are perhaps just a few thousand morphemes in a typical language, but there are tens of thousands of lexemes (or lexical items); and the number of concepts which these lexical items represent is even greater, perhaps hundreds of thousands. This is similar to the structure of the tree. You start from a very few branches at the lower level of the tree and each of these branches out, so that if you get up to the upper limits of the tree where the actual leaves are found, they are of course very numerous. Now a primary feature of the human information system is that it is a network of *interrelationships*. It can be divided into sub-networks, each of which is roughly analogous to one of these trees in the clump. Then within some of them, e.g. language, one can further subdivide into stratal systems. In the current view I have of it at least three such systems can be distinguished: the *phonemic*, the *grammatical* and the *sememic* or *conceptual*.

This concept of linguistic strata, or semiotic levels, also figures prominently in the development of the Penman Upper Model (Bateman 1992), in which '[e]ach higher-level (i.e. more abstract) stratum is seen as providing the *functional motivation* for the next lower-level stratum; and each lower-level stratum is seen as providing a resource that *generalizes* across the possibilities of the next-higher stratum' (Halliday 1978:25). Beginning with a grammatical system network at the lexicogrammatical level, realization statements of syntactic form are 'classified in terms of their potential for expressing communicative functions that are realized grammatically, such as asserting/questioning/ordering, active/passive, etc.... The grammatical semantic functions are then in turn *motivated* by semantic distinctions that classify semantic circumstances according to the grammatical features which are appropriate to express those situations.' (25) On the one hand, the abstract ontology of the Upper Model provides the 'motivational covering' or context for each choice that the grammar provides, while on the other hand, the lexicogrammar serves as a resource for both understanding and articulating semiotic constructs at higher strata of meaning and context. O'Donnell (1999) applies the same formalism—system networks and realization statements—at every level, including lexicogrammar, semantics, and context.

We likewise have adopted a network approach based on Lamb's relational networks for representing not only *word* information, but also other linguistic information at the lexicogrammatical, semantic and conceptual levels. **Figure 7** illustrates, for example, how we model *Upward Unordered OR* and *Downward Unordered AND* network nodes in OntoEdit. Nodes may be described in terms of the following relations: *direction*, *order*, *type*, *from* and *to*. The *direction* relation takes a value of type *node-direction*, either *Upward* or *Downward*. The *order* relation takes a value of type *node-order*, either *Ordered* or *Unordered*. The *type* relation takes a value of type *node-type*, either *AND* or *OR*. Both *from* and *to* take values of type *unit*, which can be a phoneme, lexeme, or sememe.



**Figure 7.** Representation of nodes in OntoEdit.

In the network diagram shown in **Figure 6** for *well*, there are multiple sememes represented by the same lexeme. This network diagram illustrates an *Upward Unordered OR* extending from a single lexemic unit to several sememic units. Whereas, in the case of synonymy (e.g. *big-large*, *hard-difficult*) there is more than one lexeme connected to a single sememic unit via a *Downward Unordered Or*.

OntoEdit also includes an inferencing capability which may be used to extend the knowledge base with information about the lexical relations between words. We may infer various semantic relations between words (polysemy, synonymy) depending on the kind of connection between units.

3. CONCLUSION. Advances in ontology modeling and processing tools have made it possible for us to combine the wealth of information contained in existing dictionary resources of various kinds, even extend that knowledge by applying axioms about lexical associations, and make this knowledge accessible according to the needs of the user, be it human or machine. The dictionary database discussed here is being used in connection with the dictionary management phase of an ongoing project looking into the example-based machine translation of legal texts.

We have developed a plug-in type of architecture for integration of lexical data from various dictionary sources, including English and Chinese language dictionaries. Since dictionaries are designed and produced for different purposes, they often organize and structure their entries differently. Using OntoEdit, an ontology modeling tool, we model the particular structure of each input dictionary resource, and

subsequently map these to a model based on the industry-supported OLIF (Open Lexicon Interchange Format) standard.

Words provide that vital link between linguistic expression on the one hand and the upper model on the other. The dictionary data drawn from these various resources represents both lexemic and sememic information, and must be able to relate with the lexico-grammatical, semantic and conceptual systems of language. We have adopted a network approach, also modeled in OntoEdit, for describing not only dictionary data, now unified according to the OLIF standard, but also other linguistic information at other levels including lexico-grammatical, semantic and conceptual. The resulting knowledge base is extendable through OntoEdit's inferencing capability, and further information about lexical relations (i.e. synonymy, antonymy, hyponymy, meronymy, etc.) between words may be inferred.

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VI



DISCOURSE  
&  
PRAGMATIC  
PERSPECTIVES





## LINGUISTIC MEANING IN THE PHYSICAL DOMAIN

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IN *LANGUAGE*, Bloomfield uses the example of Jack and Jill walking down a lane, Jill speaking, and Jack fetching an apple to propose dealing with meaning within a framework considering only phenomena that are available to scientific scrutiny (1933:22 ff.). He argues that linguists should consider only the people involved, their physiological states, relevant physical objects (e.g. the apple), and dynamic physical events (e.g. sound waves). In staking out this territory, he asserts that the data of linguistics should be obtained via observations limited to the physical domain, anticipating in this regard the position of Yngve (1986)—by more than half a century.

Confusingly, Bloomfield retreats from this position within the following pages of the book, eventually dealing with meaning in the grammatical-semiotic tradition. Why? I will show that Bloomfield (and the other Structuralists) did so in large part because of the constraints imposed by their serious misunderstanding of the nature of the objects of study available to science. Then I will use an example of an observation of communication in the real world to show that we can place linguistic meaning in the physical domain, as Bloomfield originally hoped to.

1. CONFUSIONS ABOUT THE NATURE OF THEORY VS. OBSERVATION. Bloomfield and other Structuralists confused the theory-observation dichotomy with one between abstract and concrete. Numerous examples from the literature exhibit confusion between non-directly-observable, *theoretical entities* on the one hand and *abstract entities lacking physical existence* on the other (Coleman 2001). A particularly striking example is Whorf's comparison of theory and observation in linguistics with that in physics. He identifies the observations of physics as being of 'gross physical objects' (1956:223), with such things as 'atomic structures and cosmic rays' being theoretical objects whose existence is in turn suggested on the basis of observation. To this, he compares the linguist's observation of the 'obligatory patterns made by the gross audible sounds of a given language' and consequent theories of 'meaning... [and] the structure of logical propositions' (ibid.). He clearly recognizes that 'meaning' and 'logical propositions' do not exist in the physical domain when he later (ibid. 248) contrasts the 'purely linguistic plane' with 'a physical, acoustic one, phenomena wrought of sound waves'. (By implication, the 'purely linguistic plane' is not *physical*, but *abstract*.) Now consider: although 'atomic structures and cosmic rays' are theoretical entities of physics, they are hypothesized entities in and of the physical world—not *abstractions*. Unfortunately, nowhere does Whorf notice that this nullifies his analogy of linguistics with physics.

Incidentally, the same confusion can be found *explicit* even in current textbooks in linguistics. In Coleman (2001), I have discussed in some detail a few examples of such confused explanations, including Gee (1993:186) and Radford et al. (1999:1).

This confusion, a corollary of the frequent physical-logical domain confusion identified by Yngve (1996), led the Behaviorists (and thus the Structuralists, at first) to reject the idea of theorizing about anything that could not be directly observed. To a physicist, this rejection would be puzzling, since investigators in the natural sciences regularly hypothesize the existence of objects and properties which cannot be *directly observed*. But to a linguist, apparently, the rejection goes hand-in-hand with consideration only of objects and events in the physical domain, since they treat their theories as abstractions, not models of physical-domain objects and events. We see something very closely related in the near-ubiquitous conflation of *mind* and *brain* in the literature of mentalist linguistics. This is particularly striking in some of the writings of Chomsky that purportedly focus on language and the brain (e.g. 1986 *passim*), in which the collocation 'mind/brain' frequently occurs.

So, if a linguist considers theory to be concerned with abstract objects and wants to place linguistics in the physical domain, as Bloomfield (1933) wanted to, he must avoid consideration of anything he cannot directly observe. This is the position Bloomfield has reached by the time he begins his explanation of stimulus-response (S→R) theory (about page 23 or so). Yet as he proceeds through the pages of his Jack-and-Jill example and then on to the S→R theory (over pages 22–25), we see Bloomfield recognize how untenable a position he has placed himself in. But his admission of this is only implicit: he later simply evades the constraint altogether. In all following sections of *Language*, he retreats to a conceptualization of linguistic meaning couched in grammatical-semiotic terms (his 'fundamental assumption', 78). Where he thus leads, modern linguistics has followed<sup>1</sup>.

2. WHAT IS REQUIRED TO MOVE MEANING INTO THE PHYSICAL DOMAIN? Consideration of the psychological reality of grammar within mainstream linguistics has been inconsistent, at best. When attempts by psycholinguists to validate theories have seemed to succeed, the results have been greeted warmly by theoreticians. When, on the other hand, the results of psycholinguistic studies have contradicted their claims, theoreticians have demurred with statements like, 'we do not intend our grammar to be a psychological model of a native speaker-listener', but rather a model of 'the grammar' (unlike a human being, *not* a real-world object). There have been notable exceptions, among them Lamb, whose approach is laid out in detail most recently in Lamb (1999). His intention is to show, via relational network notation, the functional properties of a speaker-listener. However, while Lamb's approach does indeed seek to build a psychologically real model, it does not look beyond what is going on inside *an* individual, to *individuals* communicating.

There is an inherent weakness to any approach which tries to describe the internal properties of the individual without looking at the individual as a part of a (larger) system in which there are two or more individuals communicating. The problem lies



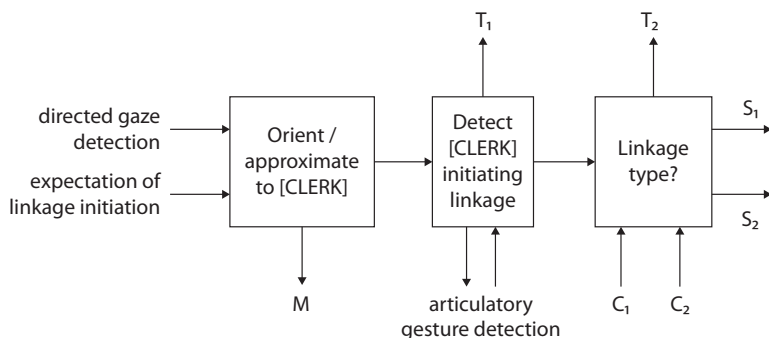
in the observer's interpretation of the meaning of what a speaker says. If a linguist looks only at one speaker (whether using himself as a native-speaker informant or someone else), how does he know, for example, that *yes* and *OK* mean about the same thing and that *no* and *uh-uh* mean something else? Obviously, he follows the standard practice of relying on his (or another's) intuition. In so doing, he accepts Bloomfield's *fundamental assumption of linguistics*, that 'in every speech community, some utterances are alike in form and meaning' (1933:78).

As Yngve has pointed out (e.g. 1986:16–18, 1996:32–33), this is a special assumption not warranted in a scientific framework. Bloomfield's assumption is especially problematic because it treats intuition as if it somehow involved observation of something real. But as Itkonen (1978), argued convincingly decades ago, it is simply not useful to treat *intuition* as equivalent to *observation* in a scientific sense; rather, scientific 'observation [is of] that... which happens or obtains in time and space' (1978:3).

So how can we know what is going on inside an individual who is communicating? Some might argue that we have had PET scans, MRI, and fMRI, and that with emerging real-time neural imaging technologies, surely we can see what is going on in the brain when someone is uttering this sentence or that one. The neural activity certainly is scientifically observable, but the utterance purportedly containing this sentence or that one is not. The very existence of entities like utterances that contain sentences depends on our acceptance of Bloomfield's fundamental assumption. They are quite unlike the articulatory gestures of speech or the resulting sound waves, which require no special assumptions in order to be observed.

It is only by looking at the observable events in a communicative interaction that we can infer what is going on inside the individual speaker. Here is an example. We are inside a bookstore somewhere in the USA. A woman is standing behind a counter. A man is standing directly in front of the counter, facing her. A few other people are lined up facing the counter. The man directly in front of the counter turns and leaves. The woman behind the counter (for convenience, the [CLERK])<sup>2</sup> looks at the person at the head of the line and—seeing that she is looking back at her—says, *Hi*. The person at the head of the line (a [CUSTOMER]) at that moment steps forward toward the counter, facing the [CLERK].

In this example, we see several participants in what Yngve (1996:126) labels a 'linkage'. What I have represented here as *Hi* is actually an articulatory gesture (a real-world event) by the [CLERK] (a real-world entity) that places energy in a channel (physically real sound waves) that are capable of reaching the [CUSTOMER] (another real-world entity) and—depending on the prior properties of the [CUSTOMER]—resulting in certain changes in the internal properties of the [CUSTOMER]<sup>3</sup>. If we want to draw an inference about the changes in the internal properties of the [CUSTOMER] at the head of the line, we can do so on the basis of observable changes in the larger system (the linkage) of which that individual is a part. For example, we can observe the articulatory gesture of the [CLERK] (which we might record as [ha:i]). We can record the resulting sound waves and measure their acoustic properties. We can then observe that the [CUSTOMER] at the head of the line moves toward the counter,



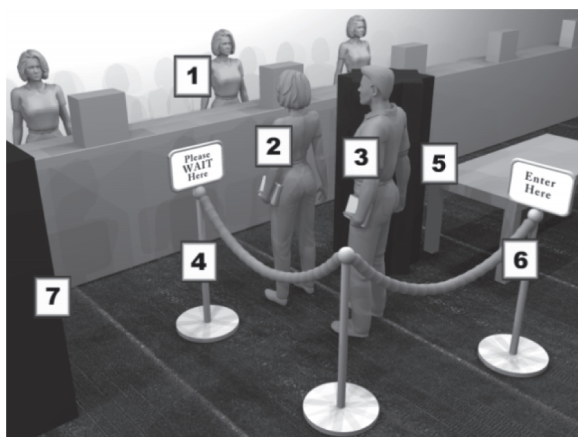
**Figure 1.** *Plex Segment.*

facing the [CLERK], and begins to speak. Thus, we can see the meaning of [ha:i] in the changes of the larger system (the linkage), at least in one sense, and infer other meanings in terms of the internal changes in the properties of the [CLERK] and the [CUSTOMER], respectively.

A relevant, but very small, part of the plex associated with the [CUSTOMER] participant is shown in **Figure 1**. In Human Linguistics, a plex is a representation of the internal properties of the communicating individual relevant to the ability to participate in a linkage (Yngve, 1996:171). A plex is conventionally represented in Boolean notation, either formulaically or diagrammatically. Here the diagrammatic variant is used. Information flow in a plex is modeled in terms of pulses and levels.

On the line labelled <expectation of linkage initiation>, there is a high (Boolean logic 1) level; this models an aspect of the state of the [CUSTOMER] while he/she is standing in a bookstore checkout line. When the [CUSTOMER] detects via visual input that a [CLERK] is directing his/her gaze toward the [CUSTOMER], the appropriate subsystem sends a high pulse of fixed duration (Boolean 1) on the line labelled <directed gaze detection>. Thus, <expectation of linkage initiation> is an enabling condition for the event <directed gaze detection>.

When the [CUSTOMER] detects the [CLERK]'s gaze directed toward him/her, the [CUSTOMER] begins to walk forward, to a point opposite the counter from the [CLERK], facing him/her. The *initiation* of this activity is modelled by a pulse going out the bottom of the procedural property <Orient / approximate to [CLERK]>. This pulse (on line M) invokes a complex set of procedural properties in separate subsystems; these involve motor activities and various motor, visual, and proprioceptive feedback loops in the [CUSTOMER]. These are the internal properties which enable the [CUSTOMER] to walk to the appropriate spot and, once there, to face in the expected direction. Once these are initiated, another relevant set of procedural properties comes into play; these are controlled by the property <Detect [CLERK] initiating linkage>. It sends a pulse down the left-hand line underneath it. While this procedure is active, the line T<sub>1</sub> has a Boolean high level. When particular articulatory gestures of the [CLERK] are detected, a feedback pulse returns on the right-hand line under the same



**Figure 2.** *The bookstore check-out line linkage.*

box—these are the first speech behaviors of the linkage. (In a large number of cases observed<sup>4</sup>, the detected articulatory gestures were those which we can transcribe as [ha:i].) At this point,  $T_1$  drops back to low (Boolean o) and a high pulse goes out on the line to the next procedure, <Linkage Type?>.

Typically, the [CUSTOMER] is in a state of waiting in line to make a purchase or to get other assistance from a clerk. We can model these two conditions in terms of a high level on either  $C_1$  or  $C_2$ . Depending on which condition applies, the procedural properties for a different linkage type will be invoked, either via  $S_1$  or  $S_2$ .

Observation shows that an additional necessary condition for the linkage of a particular type to actually get underway is for the [CUSTOMER] to reach the appropriate spot opposite the [CLERK]. So, in the plex of the [CUSTOMER], for example, there is a feedback pulse from the procedures earlier invoked by the pulse on line M upon their completion. But it is not seen in **Figure 1**. This is because it returns at a point later than the procedures shown here. Gaze direction, articulatory, and other motor sub-systems function in a complex back-and-forth synchrony with each other and with auditory, visual, and other input/feedback systems.

HL takes into its scope the very aspects of both external (linkage level) *and* internal (communicating individual level) *physical-domain objects and events* that Bloomfield *originally* claimed were crucial for us to consider. This is a position which the Behaviorists (in psychology) and the Structuralists (in linguistics) each abandoned, albeit differently. The Behaviorists denied the physical existence of any internal properties which could not be directly observed (confusing them with abstractions); the Structuralists, though they claimed the Behaviorists as their mentors, took an opposite course, quickly returning to the ancient program of language and grammar.

3. ANOTHER EXAMPLE IN THE BOOKSTORE CHECK-OUT LINKAGE. Relevant elements of the linkage are shown in **Figure 2**. Two or more [CLERK]s (1) stand behind a counter.

One or more [CUSTOMER]s (2, 3) stand in line / approach the counter. Props that take part in the initial part of the [CLERK] / [CUSTOMER] linkage include barrier elements (4–7) and the text props attached to two of them (4 and 6). The counter may also be involved as a prop, as is explained below. The typical orientation of the text prop **[Please WAIT Here]** is with the plane of the sign parallel to the face of the counter. I regard this as ‘typical’ because it was the most frequently-observed arrangement and because I several times saw an employee turn the sign to this orientation when it had (presumably accidentally) rotated on its base; I never saw an employee turn the sign to any other orientation relative to the face of the counter. The typical orientation of the **[Enter Here]** text prop was at 90° to the face of the counter. The velvet rope on the three metal posts extended first perpendicular away from the counter face and then turned at approximately 90° going from the second post to the third. There were a display of reading glasses and a table containing sale items (5) which formed a barrier to the right of the rope. To the left of the rope was a display of refrigerator magnets labelled ‘magnetic poetry’ (7), which sometimes figured into observable events.

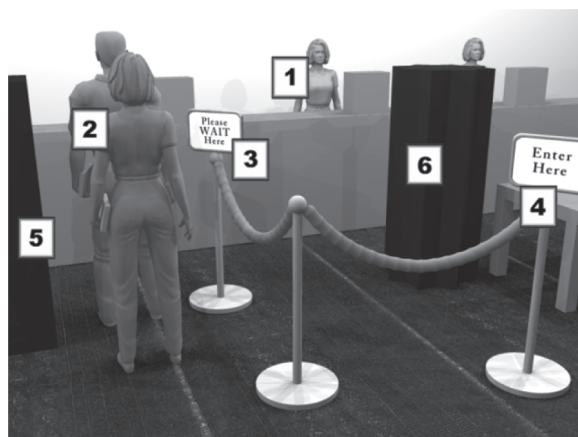
4. WHAT DOES **[Here]** MEAN? Bloomfield claims (1933:75) that we do not need to inquire about the minute nervous processes involved when a speaker utters, for example, the word *apple*, since everyone in a given speech community knows that it refers to a certain kind of fruit. To the linguist who relies on Bloomfield’s fundamental assumption, the meaning of **[Here]** on the text props (5 and 6 in **Figure 2**) is obvious: clearly, it means something like ‘in this place’. The dependence on unwarranted assumption in this instance, as so often, results in error.

When the **[Please WAIT Here]** text prop is in its typical orientation (as in **Figure 2**), [CUSTOMER]s do *not* line up *at* the sign (e.g. straddling it or as close as possible, facing it), nor to its *left*, nor between it and *the counter*, etc. Rather, they line up—with only the rarest exceptions—facing perpendicular to the plane of the text prop (4), roughly halfway between it and the reading glasses display (5), so that their bodies are nearly bisected by a plane extending out from the rectangular face of the text prop. Whenever the text prop is operative (under specific conditions, the [CUSTOMER] does not, in fact, wait), each [CUSTOMER] comes to a halt in roughly the same spot<sup>5</sup>.

Similarly, [CUSTOMER]s do not enter the line-up by leap-frogging over the **[Enter Here]** text prop, nor by stepping over the rope to the left, but generally move along a path *parallel* to the plane of that text prop.

The linguist who accepts Bloomfield’s assumption without question would now probably be ready to revise (or perhaps refine) his view with a polysemous account of the morpheme *here*. This is not necessary. It is possible to deal with the meaning of **[Here]** on the **[Please WAIT Here]** and **[Enter Here]** text props without recourse to Bloomfield’s fundamental assumption and without introducing the concept of polysemy.

First, we do not need to introduce any non-physical-domain entities like morphemes or semantic features, entities whose existence depends on the intuition of the observer. In this particular case, we have marks on two text props which are almost identical topologically (both resemble ‘Here’).



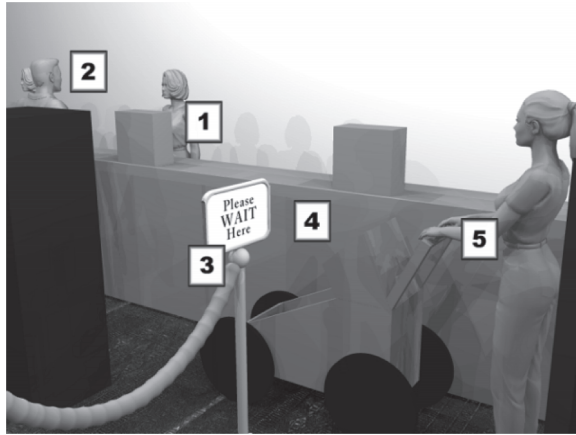
**Figure 3.** The effect of 45° clockwise text prop rotation.

Second, we can see how the observable behaviors of people are affected by the two text props. We can see this especially clearly when the orientation of one of the text props varies. Although the typical orientation of the **[Please WAIT Here]** text prop is as shown in **Figure 2**, a **[CUSTOMER]** waiting in line would sometimes be in conversation with another person in line, and would back into the text prop or its supporting post. A **[CUSTOMER]** walking around the text prop to go to a **[CLERK]** would also sometimes bump it and cause it to turn.

The post was thus sometimes rotated clockwise (see **Figure 3**) so that the **[Please WAIT Here]** text prop (3) was at a nearly 45° angle to the face of the counter, with its plane roughly intersecting the post holding the other text prop (4). It happened that for a period of time during one observation session, this occurred, and the **[Enter Here]** text prop had also rotated so that the two text props were nearly in the same plane, both at about 45° to the face of the counter. During this time, the proportion of **[CUSTOMER]**s (2) who lined up on the left side of the **[Please WAIT Here]** text prop (3) was significantly greater than at any other time (**Figure 3**).

At one time, the **[Please WAIT Here]** text prop rotated counter-clockwise almost exactly 90° (**Figure 4**, overleaf). It happened that at that time the only two **[CLERK]**s (1-2) were working at cash registers to the left of the text prop (3). A woman (5) pushing her baby in a stroller got in line so that she was facing perpendicular to the plane of the text prop, with the *stroller* (4) roughly bisected by the plane of the text prop.

In each individual case, with both text props, **[Here]** is related to the text prop being the locus of a change in an observable property of the **[CUSTOMER]** at the linkage level (the level at which the **[CUSTOMER]** is part of the larger system referred to as the *linkage*). The customer moves or halts at a highly predictable location or moves along a highly predictable path. When this happens, the linkage changes state. For example, when the **[CUSTOMER]** moves forward from a position halted beside the **[Please WAIT Here]** text prop and stands face-to-face with the **[CLERK]** the linkage has moved from



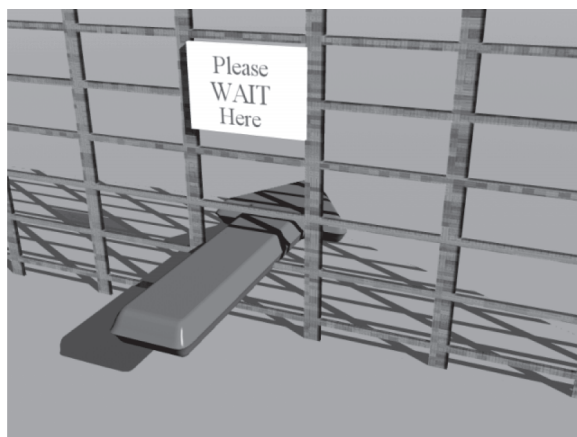
**Figure 4.** *The effect of 90° counter-clockwise text prop rotation.*

a phase of just having been initiated by the [CLERK] to its next phase. We can see the physical change in location and orientation of the [CUSTOMER]. From the events we can observe at this level, we infer changes in the internal properties of the participants. We conclude, for example, that there are conditional properties (Yngve 1996: 140–43) in the [CUSTOMER] that are triggered by the conditions of mutually directed gaze and the [CLERK] saying *Hi*.

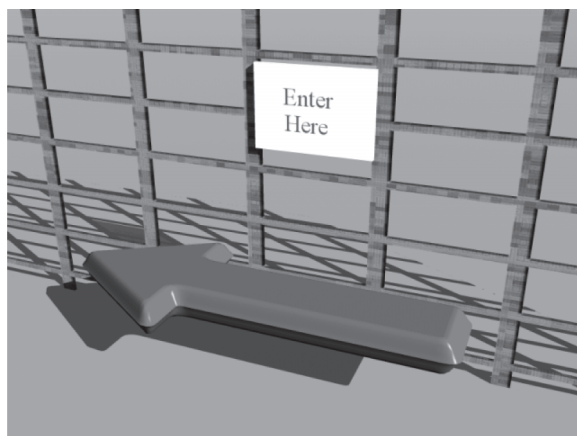
5. AVOIDING RECOURSE TO POLYSEMY. How can we deal with the different behaviors of a given [CUSTOMER] relative to the two text props—since both contain the same text prop component [**Here**]<sup>6</sup>—without recourse to (non-scientific) intuition that tells us it is the same word, the same morpheme, etc.? Ruhl's (e.g. 1989, 1998) theory of monosemy suggests an approach that is certainly compatible with physical-domain theories of human communication. He suggests that polysemy is generally, if not always, only apparent—the result of complex interactions in the linguistic signal. In this case, we have [**Here**] in the one instance juxtaposed with [**Please WAIT**], with [**Enter**] in the other. It may be helpful, therefore, if we look to [**Please WAIT**] and [**Enter**] (and the externally-observable changes in participant properties with which they are associated) for a solution.

With the [**Please WAIT Here**] text prop, we generally observe [CUSTOMER] halting. The plane of the text prop provides the locus for this change of state (Figure 5). Other markers additionally (the post and rope, and the reading glasses display in Figure 2) delineate the functional barrier for the halting.

Associated with the [**Enter Here**] text prop, we generally do not see [CUSTOMER] halting, but we do see the [CUSTOMER] moving along a highly predictable path more or less parallel to the plane of the text prop (Figure 6). Associated with the text prop component [**Enter**], we thus see movement along a path.



**Figure 5.** *[Please WAIT]* and *[customer]* halting.



**Figure 6.** *[Enter]* and *[customer]* path.

It is thus a highly iconic usage of the shape of the text props for the plane extending out from the **[Please WAIT Here]** prop to indicate a barrier and that extending out from the **[Enter Here]** prop to indicate a path. We can describe what is going on in terms of conditional properties of the participants, in which text prop elements such as the shapes of marks, the orientation of the props themselves within the participants' environment, and even other props (such as the ropes and displays) are relevant to participants' interpretations of the text props. We do not need to introduce Bloomfield's fundamental assumption in order to deal with two different senses of the morpheme *here* because we do not have to consider non-real-world entities like morphemes, let alone their supposed polysemy arising from defective semantic-feature-based accounts.



6. CONCLUDING REMARKS. I have recorded observations of bookstore customers' verbal and nonverbal behavior while they wait for an available cashier. Standard treatment of the *language* involved (maintaining domain confusions between the physical and abstract) considers meaning a property of utterances, but does so by projecting properties of people onto external events (Yngve 1996:2–3). Instead, as I have shown, we can treat meaning without domain confusions by focusing on changes in linkage properties, from which we can infer changes in properties of participants. A qualitative analysis of real-world observations has shown how in one case—and also suggests broader implications for a completely physical-domain treatment of linguistic meaning.

- <sup>1</sup> Herein lies is a key difference between Yngve's (1996) Human Linguistics and Behaviorism. Just because the internal properties of a communicating individual are not directly observable does not mean they lie outside the physical domain. We cannot directly observe neural activity in a speaker's brain *in real-time* (that is, in very small time-slices) at a fine scale (neuron-by-neuron). Yet neurons are a part of any theory of human physiology that is couched purely in physical-domain terms, not as philosophical abstraction. The internal properties of the communicating individual referred to by Human Linguistics (HL) are at a larger scale than these, but they are nonetheless theoretical entities intended to correspond to physical-domain realities. The mere fact that such properties are posited in HL is in stark contrast to Behaviorism's (claim of a) refusal to theorize about entities not directly observable on the grounds that they such entities are purportedly 'abstract'.
- <sup>2</sup> It is conventional in HL to place names of systems in square brackets, e.g. [CLERK]. So as to help avoid possible confusion with transcription of articulatory gestures (e.g. [ha:i]), I have indicated such system names in a separate font with all caps, except in the case of text props and their components, where a physical resemblance to the observed object is desired (e.g. [Enter Here]); in such cases where mixed upper and lower case is needed, I have used boldface to help distinguish them.
- <sup>3</sup> Here and elsewhere, I say 'internal properties' when I might, in Yngve's (1996) terms, say 'linguistic properties'. I prefer the former for the sake of readers who are not very familiar with the HL framework, as they may confuse 'linguistic properties' with 'properties of language'. The properties in question belong to a *communicating individual* (an HL model of something in the physical domain accessible to science), not to *language* (which exists, rather, fully in the mental domain familiar to philosophy).
- <sup>4</sup> This and other generalizations presented here are made on the basis of observations of 141 customers waiting in line at a local bookstore over three afternoons, each session about one hour in length.
- <sup>5</sup> If there are no other [CUSTOMER]s already in line and the [CUSTOMER] and [CLERK] have mutual directed gaze, then the [CUSTOMER] does not stop near the text prop, even if the [CLERK] does not speak until the [CUSTOMER] has passed beyond it and is at, or almost at, the counter.
- <sup>6</sup> The reader is advised caution here: I am using the notation in square brackets (e.g. [Please WAIT]) to refer to text prop components definable in terms of their topological properties. I am not referring to *words* or *morphemes*, etc.



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## TOWARDS A STATISTICAL INTERPRETATION OF SYSTEMIC-FUNCTIONAL THEME/RHEME<sup>1</sup>

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FOR SYSTEMIC-FUNCTIONAL LINGUISTICS, the initial part of the English clause provides a semantic orientation to the rest of the message, and is thus the Theme of the clause. Systemicists have seen clause Themes as a realization of the 'method of development' of the local discourse. Another focus in the clause relating to discourse structure is the last element, or 'N-rheme', which is the climax to the point of the message; N-rhemes collectively realize the point of the discourse. This paper offers a quantitative interpretation of Theme and N-rheme centering on the role of reference chains in the method of development. The distribution of reference chains in Theme and Rheme and the referential densities of Theme and Rheme help to define them.

1. BASIC SYSTEMIC-FUNCTIONAL THEME/RHEME. The basic definition of Theme provided by M.A.K. Halliday (1967:212) is 'what is being talked about, the point of departure for the clause as a message'. Theme is a grammatical meaning, realized by the initial stretch of clause text, from the beginning through the first clause element which has a propositional role, i.e. is referable to 'experiential' meaning; the rest of the clause is the Rheme. The simplest examples belong to declarative mood: in 'John loves Mary', *John* alone realizes Theme because it is the first element which has experiential reference, and no other element precedes it. That it is also the Subject element is somewhat immaterial. In other mood types, non-Subject elements may typically be Theme, as in Wh- questions, where the Wh- element typically constitutes or ends the Theme stretch whether Subject or not, or in the typical case of imperative mood clauses, where Subject is not expressed and the lexical verb constitutes or ends the Theme stretch.

In less typical clause structures, marked Themes may be realized by inversion or pre-posing. In 'Mary John loves' the potential for ambiguity is resolved by taking *Mary* as a thematized Complement, and the whole of the Theme. Marked Themes in Wh- questions can be realized by pre-posed Adjuncts with circumstantial import, and the same is true of declarative mood and imperative mood clauses. In the latter, a marked Theme may also be realized by a Subject which constitutes or ends the Theme stretch: 'You be quiet!' (Halliday 1994:37-48).

The Theme part of the clause will contain 'multiple' elements if the first element which has experiential reference is preceded by other elements. In such a string of Theme elements, the element with experiential reference which terminates the string is called the 'topical' Theme, and the preceding elements, which have either 'textual'

|                   |                             |                    |                    |                    |         |                                        |
|-------------------|-----------------------------|--------------------|--------------------|--------------------|---------|----------------------------------------|
| Well              | then                        | Veronica           | frankly            | can't              | we      | just put<br>it in the waste-<br>basket |
| Continua-<br>tive | Conjunc-<br>tive<br>Adjunct | Vocative           | Comment<br>Adjunct | Finite             | Actor   |                                        |
| textual           | textual                     | interper-<br>sonal | interper-<br>sonal | interper-<br>sonal | topical |                                        |
| THEME             |                             |                    |                    |                    |         | RHEME                                  |

**Table 1.** Example of multiple Theme elements.

or ‘interpersonal’ meanings, are sub-classified with their own functional labels. In the clause analyzed in **Table 1**, the Subject *we* is the first element in the clause to play a role in transitivity, that of Actor. Since this is an experiential meaning, it terminates the Theme stretch. But the clause has been initiated with two elements having textual meaning, a Continuative and a Conjunctive Adjunct. The clause continues with interpersonal meaning elements, a Vocative, a Comment Adjunct, and the Finite verb element. Other textual meaning elements include conjunctions, and other interpersonal meaning elements include Mood Adjuncts (Halliday 1994:48–54).

The Systemic-Functional view of the Theme/Rheme contrast also finds it in grammatical units both above and below the clause. Sentence, for example, is viewed as a complex of clauses related by parataxis or hypotaxis or both. A subordinate clause initial to the clause-complex realizes its marked Theme. If it is the main clause which is initial in the complex, then its clause Theme is also the unmarked Theme of the whole complex (Fries 1981/1983:121; Halliday 1994:56–57).

2. ALTERNATIVE SYSTEMIC-FUNCTIONAL MODELS FOR THEME/RHEME. Within Systemic-Functional linguistics various alternative accounts of Theme/Rheme build on or qualify this basic Hallidayan model. Berry progresses from a position that Theme is realized by the initial element of clause (1987:71, 76), to a second position that Theme is realized by all clause elements before the verb (1989:71, 1995:64), and finally to endorsing a view that Theme is realized by all clause elements through the lexical verb (1996:35–46). Downing (1991:127) independently proposes that a Subject as topical Theme may be preceded by other experiential Themes. Matthiessen elaborates a view originally suggested by Halliday (1979/2002:207–11; 1982/2002:233–34; and cf. 1994:336–37) that Theme is realized with progressively diminishing effect from the beginning of the clause through to its centre. Textual meaning in the clause is describable as a periodicity or wave-shape, with peaks of prominence at the beginning of the clause and at the end (the ‘New’: cf. Halliday 1994:296–302). The Theme effect, as the first peak of prominence, falls off progressively from the beginning of the clause in a decrescendo which can extend even beyond a marked Theme through the Subject element. Describing the Theme as a uniform sequence of clause elements is simply to impose a segmental method of description on a curve (Matthiessen

|                        |         |                                   |
|------------------------|---------|-----------------------------------|
| In the beginning       | God     | created the heavens and the earth |
| Circumstantial Adjunct | Subject |                                   |
| topical                | topical |                                   |
| THEME                  |         | RHEME                             |

**Figure 2.** Example of multiple topical Theme elements.

1988:164–166, 170–171; 1992:38–52; 1995a:513–519; cf. Martin 1992:10–12; 1995:225–227). Ravelli (1995:219–226) also accepts that the Theme effect can extend beyond a marked Theme through the Subject. All these views suggest that more than one experiential theme element can be present in the Theme of the clause, as in **Figure 2**.

Another alternative account of Theme/Rheme within Systemic-Functional linguistics focuses on the meaning of Theme, rather than its realization. Fries (1995b:55) suggests that the original Hallidayan definition of the meaning of clause Theme is metaphorical and needs to be elaborated by connecting Theme with its role as an element in the organization of the discourse (see also Hasan & Fries 1995:xix; Fries 1995a:4). In a coherent text segment, successive clause and sentence (clause-complex) Themes can reflect or ‘construct’ the ‘method of development’ (Fries 1981/1983:116, 119, 125, 135; 1995a:9; 1995c:324), i.e. the structure, particularly the outline structure if one is present (Fries 1981/1983:116, 121). If the method of development is simple, then successive Themes can reflect a consistency in ‘field’, with relatively few experiential meanings and relatively few semantic sub-fields (Fries 1981/1983:149; 1995a:9; 1995c:323–24). Halliday (1993:95) conceives of this consistency as recurring ‘motifs’ within successive Themes, which are thus seen to be part of a method of development.

A text segment’s method of development is further characterized by Martin (1992:434–48; 1993:241–44) as a locus for the interaction of Theme, conjunctive relations, reference chains, lexical strings—and grammatical metaphors as well. The potential for consistency of experiential meanings in this is often explicitly predicted in a text segment’s ‘topic sentence’ or ‘hyper-Theme’; successive hyper-Themes may in turn be predicted by a ‘macro-Theme’, typically a ‘topic’ paragraph (1992:434–48; 1993:244–47, 249–51; cf. Halliday 1985:367). But interpersonal meanings also are important to the method of development, e.g. as realized by the Subject element, particularly in the form of personal pronouns (Martin 1992:434–48), or as realized by multiple Theme elements (1995:244–245, 247–253).

In relation to the method of development then, Theme in its own clause or sentence is seen to provide a ‘framework’ to the message, to ‘orient’ the message (Fries 1994:234; 1995c:318, 326; 2002:125–26). This suggests both consistency and logical variety within consistency. Although Theme is not the same as presuming reference, most Themes contain it, and in some genres (e.g. narrative) there occur long chains of Themes which are the same concept (Fries 1981/1983:124; 1994:230–31; 2002:122–23). This explains the general correlation of Theme with Given (Fries 1981/1983:116, 144). On the other hand, Theme as a signpost of logical variety can provide information in which to interpret the rest of the message (Fries 1995b:58). It can ‘cancel an assumption’ supplied from context (Fries 1995b:60). It can ‘prevent temporal or locational misin-

terpretation' (ibid). It can be a reference to an 'item being elaborated' (Fries 1995b:62). The concept of Theme as a signpost of logical variety is dealt with by Matthiessen in terms of the conjunctive relations which are so prominent within the method of development: Theme can represent conjunctive expansion, under the terms 'elaboration' (more about the same), 'extension' (something different), or 'enhancement' (qualification) (Matthiessen 1992:60–66; 1995b:26–40; cf. Halliday 1994:225–50; for a further discussion of method of development cf. Gómez-González 2001:98–100).

The method of development is thus instantiated within the clause by the first peak of prominence in the textual wave pattern. The second peak of prominence, the New, instantiates a complementary component of the discourse strategy, the 'point' of the discourse. The point of some coherent text segment is the fresh information which the text supplies and is most typically realized by the last element of group rank in the clause, termed the 'N-rheme' (conflating 'New and Rheme': Fries 1981/1983:128–29; 1992:464; 1994:232–234). The kinds of information selected in the method of development and the kinds within the point tend to be different (Fries 1981/1983:135; 1992:464, 478–479; 1993:338–39), although the two areas may also share or exchange particular concepts (cf. Fries 1995c:351). The field of information represented by the point tends to be more articulated and more highly lexicalized than in the method of development. Point is thus more field-oriented than the method of development, which is more genre-oriented (Martin 1992:452; 1993:244). In parallel with the hyper-Theme and macro-Theme concepts, the text segment may contain a 'hyper-New', a clause which represents of itself the point of the segment, and the larger discourse may contain a 'macro-New', a paragraph which summarizes all the points (Martin 1992:453–60; 1993:247–51). Accordingly the point of the discourse is seen to have its own pattern of motifs (Halliday 1993:95–104), implying its own kind of structure.

3. METHOD OF DEVELOPMENT AND POINT IN NARRATIVE AND EXPOSITORY TEXTS. Two short text segments illustrate these points. The first is a paragraph from *The Fellowship of the Ring*, vol. 1 of *The Lord of the Rings*, depicting the four Hobbits and their five heroic companions making a pause after two weeks of night-time travel from Rivendell in the direction of Lothlorien. The terrain in this scene is characterized by 'a low ridge crowned with ancient holly-trees' (Tolkien 1999:370). In **Figure 3**, clauses with a Theme/Rheme structure are numbered consecutively and their Themes bolded<sup>2</sup>. The N-rhemes of non-embedded clauses are italicized (necessarily including the whole of consecutive clauses embedded within the N-rheme, e.g. clauses 3 and 4). Theme is reckoned to run through any Subject element preceding the verb (but excluding ellipted Subjects), making for more than one topical Theme in clauses 1, 9, 11 and 14.

The single most prominent consistency in the text is the referential and non-referential naming of the members of the Company. This simple pattern dominates the method of development, which is otherwise varied by mostly grammaticalized conjunctive relations that further articulate the outline framework for the narration. The main outline division is between clauses 1–7, which deal with the whole Company, and clauses 8–16, which focus on Aragorn alone. Topical Theme 'Only Aragorn' is

- |    |                                                                                                |
|----|------------------------------------------------------------------------------------------------|
| 1  | <b>That morning they</b> lit a fire <i>in a deep hollow shrouded by great bushes of holly,</i> |
| 2  | <b>and their supper-breakfast</b> was <i>merrier</i>                                           |
| 3  | <b>than it had been</b>                                                                        |
| 4  | <b>since they</b> set out.                                                                     |
| 5  | <b>They</b> did not hurry to bed <i>afterwards,</i>                                            |
| 6  | <b>for they</b> expected to have <i>all the night to sleep in,</i>                             |
| 7  | <b>and they</b> did not mean to go on again <i>until the evening of the next day.</i>          |
| 8  | <b>Only Aragorn</b> was <i>silent and restless.</i>                                            |
| 9  | <b>After a while he</b> left <i>the Company</i>                                                |
| 10 | <b>and</b> wandered <i>on to the ridge;</i>                                                    |
| 11 | <b>there he</b> stood <i>in the shadow of a tree,</i><br>looking out southwards and westwards, |
| 12 | <b>with his head</b> <i>posed</i>                                                              |
| 13 | <b>as if he</b> was <i>listening.</i>                                                          |
| 14 | <b>Then he</b> returned <i>to the brink of the dell</i>                                        |
| 15 | <b>and</b> looked down <i>at</i>                                                               |
| 16 | <b>the others</b> <i>laughing and talking.</i>                                                 |

**Figure 3.** Tabulation of a narrative text segment. (Tolkien 1999:372–73)

thus also implicitly a conjunctive elaboration within the method of development and simultaneously signals an extension within the pattern of information belonging to the point. The first block of clauses is introduced by a time Adjunct ('That morning'), and the second block also, but only in its second clause (9, 'After a while'); the delay is appropriate, because clause 8 is actually a transitional hyper-Theme introducing the whole of the second block. The two divisions have contrasting means of making explicit their respective outline substructures. After the initial time Adjunct, the non-embedded clauses of the first part relate only with coordinate conjunctions, or in the case of clause 5, without explicit conjunction at all. But besides just two coordinate conjunctions, the second part uses a subordinate conjunction, a conjunctive preposition, a focusing subjunct ('Only'), two time Adjuncts, and a place Adjunct.

What is the structured point to which this framework orients? It could be stated as 'naïve relaxation vs. alert vigilance'. All the N-rhemes convey attitude (except in clause 9), almost entirely by symbolic activity or symbolic time/location; attitude is explicitly lexicalized only in clauses 2 and 8. Thus the deep hollow of clauses 1 and 14 is chosen as a secure, unseen location for fugitives; merriment and noise in 2–4 and 15–16 signify a newly relaxed emotional state; negated goals of sleeping and going on in 5–7 represent deferred practicalities. Aragorn's contrasting insecurity is lexicalized in 8, and his contrasting choice of the height and of keeping watch there in 10 and 11–13 respectively signify his vigilance. There is also an underlying principle of contrast which explains the order of the N-rhemes: security (1), relaxation (2–4), practicality (5–7), insecurity (8), vigilance (10–13), security (14), relaxation (15–16). This sequence begins and ends with the attitudes of security and relaxation, and the

|     |                                                                                                                            |
|-----|----------------------------------------------------------------------------------------------------------------------------|
| 1   | <b>This warping</b> , in turn, affects <i>other objects moving in the vicinity of the sun</i> ,                            |
| 2   | <b>as they</b> now must traverse <i>the distorted spatial fabric</i> .<br>[Using the rubber membrane-bowling ball analogy, |
| 3   | <b>if we</b> place a small ball-bearing <i>on the membrane</i>                                                             |
| 4   | <b>and</b> set it off <i>with some initial velocity</i> , ]                                                                |
| 5   | <b>the path</b>                                                                                                            |
| 6   | <b>it</b> will follow                                                                                                      |
| (5) | depends <i>on</i>                                                                                                          |
| 7   | <b>whether or not the bowling ball</b> is <i>sitting in the center</i> .                                                   |
| [8  | <b>If the bowling ball</b> is <i>absent</i> , ]                                                                            |
| 9   | <b>the rubber membrane</b> will be <i>flat</i>                                                                             |
| 10  | <b>and the ball bearing</b> will travel <i>along a straight line</i> .                                                     |
| [11 | <b>If the bowling ball</b> is <i>present</i>                                                                               |
| 12  | <b>and</b> thereby warps <i>the membrane</i> , ]                                                                           |
| 13  | <b>the ball bearing</b> will travel <i>along a curved path</i> .<br>[In fact, ignoring friction,                           |
| 14  | <b>if we</b> set the ball bearing moving <i>with just the right speed in just the right direction</i> , ]                  |
| 15  | <b>it</b> will continue to move <i>in a recurring curved path around the bowling ball—</i>                                 |
| 16  | <b>in effect it</b> will “go <i>into orbit</i> .”                                                                          |
| 17  | <b>Our language</b> presages <i>the application of this analogy to gravity</i> .                                           |

**Figure 4.** Tabulation of expository text segment (Greene 2000:69).

middle is an intensifying contrast by motifs of practicality, then insecurity and finally vigilance. The effect is to recontextualize and so to re-evaluate the attitudes of security and relaxation—which now seem to be undercut by Aragorn's dissent. Thus the division between relaxation and alertness (between clauses 7 and 8) is framed by the major division in the method of development. The first part substructures relaxation by the simple conjoining of symbols. The second part, however, narrates symbolic movement in time and location, which is facilitated by the framing Adjuncts.

That the principles of method of development and point apply equally well to a different genre is demonstrated by the expository paragraph in **Figure 4**. The subject of discussion is Einstein's view of gravity, that is, the warping of space-time by material bodies, which in the neighboring text has been compared to the seating of a bowling ball on a stretched membrane of rubber. In this paragraph, marked sentence Themes (bracketed) in the form of initial subordinate clauses play an important role. At first glance the method of development may not look simple, but in fact the paragraph is dominated by just two classes of meanings, objects and geometry. The central part, clauses 8–13, is the core of the analogy: the Themes contain only a few objects, repeated in the same sequence—bowling ball, rubber membrane, and ball bearing—and all the N-rhemes but one contain an assortment of geometrical meanings—absent, flat, along a straight line, etc. Further conjunctive symmetries in these six clauses are not hard to find. The immediately preceding clauses, 3–7, introduce the



analogy, in the spirit of a hyper-Theme. The immediately succeeding clauses, 14–16, summarize the point of the analogy in the spirit of a hyper-New–and add a crucial link to orbiting bodies. Both these sections contain sentence Themes with conjunction ‘if’, general ‘we’, and reference to the ball bearing, and again there are further conjunctive parallels to discover. In fact all four sentences of the three sections are linked by similarly structured sentence Themes, while all of the N-rhemes express various geometric meanings. The first two clauses, 1–2, are very different from the rest because they serve as a transition from the preceding paragraph and might easily have been graphologically included in it. The last clause, 17, picks up its Theme from the N-rheme of the hyper-New which it is elaborating. Each of these sections is thus framed by the separate tendencies of its Themes, which constellate in a general framework in great part on the principle of symmetry. But the point of the paragraph is focussed on the variety of geometrical results.

#### 4. TOWARD A QUANTITATIVE INTERPRETATION OF THE METHOD OF DEVELOPMENT.

The Systemic-Functional understanding of method of development and point sees them as functionally different but complementary—one is a framework, the other the framed set of informational goals. A consequence is that each is represented by a different kind of language. These differences are not so easily detected within each single clause but are revealed in the collective patterning constituted by the successive Themes of clauses and the successive Rhemes. For example, the method of development is factored by a lot of grammatically explicit conjunctions; the point is not. The point tends to have highly differentiated lexis; the method of development does not. Both parts of the discourse strategy show consistency and variety, but of different kinds. Systemic-functional research has tended to demonstrate these points by intuitive and qualitative analyses. Adding to this a quantitative analysis of the language differences between method of development and point would serve two purposes: first, differences in the respective languages of each part could thereby be seen proportionally; and second, a method would be developed for a principled comparison of variation in texts which use the language of Themes and the language of Rhemes differently among themselves.

The easiest way to illustrate this is to defer consideration of logical variety and instead to analyze relative consistencies quantitatively. A good place to start is presuming reference, one of the easiest aspects of consistency to analyze. (Criteria to distinguish presuming from other kinds of reference can be found in Martin 1992:102–40.) Presuming reference typically exhibits itself in ‘reference chains’ (Martin 1992:140–57), also called ‘identity chains’ (Halliday & Hasan 1985:84). Distribution of these chains into Themes has been studied by Francis (1989:211–12; 1990:64–66), Fries (1995c:350–54), Martin (1992:434–48) and others. The point to make here is that reference chains are more a characteristic of successive Themes rather than of N-rhemes, and that this disproportion can be measured. For example, in **Figure 3**, ‘a ...hollow’ of clause 1 is chained with the presuming reference of ‘the brink of the dell’ in clause 14; ‘the ridge’ of clause 10 presumes an earlier reference to the holly-crowned

ridge. But these 3 elements within 2 small chains in the N-rhemes of non-embedded clauses are proportionally outweighed by comparison with the single long chain of 12 elements referring to the Company or its members. Only 1 of these 12 elements is found outside a Theme (clause 9), and in addition there are the chained Theme elements 'That morning' (1) and 'there' (11). Thus chain elements are 76% in Themes and 24% in N-rhemes. (Excluded from this and the following analyses, because they lack grammatical prominence, are ellipted Subjects, Theme/Rheme in embedded clauses, and chain elements deeply embedded within group structures; chaining with the preceding text is included)<sup>3</sup>.

The expository paragraph of **Figure 4** seems to suggest somewhat different proportions. There are 13 elements of various chains within clause Themes (54%), 8 belong to N-rhemes (33%), and 3 fall elsewhere in Rhemes (13%), a location hereafter named with Fries's term 'Other' (1992:478). Although the proportions favour the method of development in both kinds of text, the difference in the actual proportions may be seen to reflect a characteristic strategy of the expository paragraph—that its point depends more fully on the exchange of identities between Theme and Rheme, especially the bowling ball, the membrane and the ball bearing.

Another way of comparing method of development and point for the use of reference chains is to determine how much of the experiential reference in each part of the discourse strategy is chained. This is done by dividing the number of chain elements by the number of experiential elements in all of the Themes and all of the Rhemes respectively. The results represent the relative chain-element densities in the method of development and the point. In the Tolkien paragraph, for example, the Themes contain 15 experiential elements, of which 13 are chained, for a density of 87%. The density of the N-rhemes is 31%, and that of the Other is 0%.

A third method of comparison is to determine how much of a factor in each part are the long chains, if any. This involves two different questions: a) what proportion of long chains go into Themes, and b) what proportion of the chained elements in Themes are from long chains? In the Tolkien passage one chain has 12 elements, while the next longest have but 2. Of this longest chain, 11 elements occur in Themes, that is 92%. Altogether there are 13 chained elements in Themes, of which 11 are from the long chain, for a proportion of 85%. The significance of the long chain to the method of development must take both these proportions into consideration, so to interpret them together, their product is derived: percentage of long-chain elements in Themes multiplied by percentage of chained Theme elements from long chains yields a 'long-chain/Theme product'. In the case of the Tolkien paragraph it is 0.776.

For comparison, similar kinds of data have been derived for some longer text segments. The table of **Figure 5** shows the distribution of chain elements, the density of chain elements, and the long-chain factors for longer extracts from two narrative texts, *Of Human Bondage* and *David Copperfield*, and two recent expository popular science texts *The Elegant Universe* (Greene 2000) and *The Time Before History* (Colin Tudge, Touchstone, 1997). These four genre specimens were chosen because each is seemingly unmixed with the other genre. Their lengths vary from 2 to 3 para-

| Text segment from | Chain element distribution in |       |         | Chain element density in |       |         |
|-------------------|-------------------------------|-------|---------|--------------------------|-------|---------|
|                   | Theme                         | Other | N-Rheme | Theme                    | Other | N-Rheme |
| HmBn.             | 61 %                          | 16 %  | 23 %    | 76 %                     | 21 %  | 33 %    |
| Copp.             | 51 %                          | 19 %  | 30 %    | 77 %                     | 21 %  | 40 %    |
| Univ.             | 55%                           | 20.5% | 24.5%   | 77%                      | 23%   | 40%     |
| Hist.             | 85 %                          | 0 %   | 15 %    | 83 %                     | 0%    | 18 %    |

| Text segment from | Long chain distribution: |             |         |
|-------------------|--------------------------|-------------|---------|
|                   | % in Themes              | % of Themes | Product |
| HmBn.             | 76 %                     | 81 %        | 0.621   |
| Copp.             | 60 %                     | 50 %        | 0.300   |
| Univ.             | 42%                      | 19%         | 0.077   |
| Hist.             | 88 %                     | 20 %        | 0.175   |

**Figure 5.** Table of proportions for four texts.

graphs, and from 324 words in 35 clauses to 513 words in 57 clauses. Their chains are considered long if of more than 6 elements. The number and length of all the specimens discussed are too modest for a statistical validation, but the results suggest certain conclusions. The preference of reference chains for Theme is universal in all three types of measurement. Theme is distinguished from Rheme most radically in the figures for density. Variation within genres can be considerable. The expository specimens are not greatly distinguished from the narrative specimens except in the long-chain distribution factors, perhaps typical of the genre (Francis 1989:211; but cf. Halliday 1994:336). The style of the last specimen is particularly striking, with an immense preference for reference chaining in Themes, but an equally immense preference for short chains, leading to its low long-chain product.

5. CONCLUSION. In closing it should be noted that the original decision to extend Theme status through any Subject preceding its verb was of course motivated by the contributions such Subjects typically make to the topical consistency of the method of development, even when preceded themselves by other experiential elements. But now it may also be seen to be motivated by the sharpening of the contrastive reference-chain measurements between Theme and Rheme which results. A last note of caution about the relation between Theme and reference should also be sounded. It is quite possible for isolated segments of text from whatever genre not to show an abundance of reference chaining in Theme. Some specialized sub-genres will characteristically avoid it, e.g. kitchen recipes. It is a predominant characteristic of the method of development, but not without exception. It must also be remembered that Theme and reference are not the same, any more than Theme and Given are the same (Fries 1994:230–31; 2002:117–23). But if thematic meaning is to be understood as a building block in the method of development, then it must be understood in terms of its own

peculiar kind of language, a small but significant part of which is the relative distribution of presuming reference.

- <sup>1</sup> I would like to thank Peter Fries for reading and commenting on this paper in its draft stage.
- <sup>2</sup> Some clauses do not have a Theme/Rheme structure. For example, many non-finite clauses lack the Theme element in the form of either a conjunctive or a Subject (Halliday 1994:62). An example is 'looking out southwards and westwards' after numbered clause 11.
- <sup>3</sup> Reference chains are considered to include groups which realize the referenced participant in the form of a possessive determiner (Martin 1992:147), e.g. 'his head' (12)—a principle which is extended to groups which realize the referenced participant in the form of a prepositional complement within the Qualifier element (post-modifier), as in the case of 'the brink of the dell' (14). Embedding of the referenced participant beyond this level diminishes its grammatical prominence beyond reasonable consideration. However the nominal group part of prepositional phrases is treated as if not embedded in the phrase's structure; that is, on the issue of embedding, prepositional phrases ('in a deep hollow...' etc.) and groups are treated as if the same.

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## HOW DOES SCIENCE EXPRESS UNCERTAINTY?

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THE YEAR 2003 MARKS THE FIFTIETH ANNIVERSARY of a brief research report by Watson and Crick on the discovery of DNA, first published in *Nature*, April 25, 1953, and reprinted by Stent and others many times. That report is credited with establishing both the field of molecular biology and a new style of science writing. The basis of the style is what Halloran (1997:39) calls 'an ethos, a characteristic manner of holding and expressing ideas, rooted in a distinctive understanding of the scientific enterprise'. This ethos allows a previously unacceptable personal tone that uses understatement but can communicate supreme confidence. It expresses uncertainty with 'hedging', a term that George Lakoff defined in 1972 as wording 'to make things more or less fuzzy' (cited by Hyland 1996:251). Hedging contradicts the stereotypical notion that science deals only with established knowledge concerning indisputable facts and so never involves uncertainty.

As Halloran and others suggest, it is appropriate to examine the prevalence of a change in style now that the paradigm changes are accepted. The problem of an inappropriate approach was exemplified by Newton's failure when he presented his ideas as revolutionary. They were not accepted until thirty years later, when he presented his work *Optics* as evolutionary (Gross 1997:27–34). The revolutionary but accepted DNA report begins with hedging and labeled novelty. 'We *wish to suggest* a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has **novel** features...' The widely quoted and coyly hedged conclusion adds only a little certainty: 'It has not escaped our notice that the specific pairing we have *postulated immediately suggests* a *possible* copying mechanism for the genetic material. Full details of the structure, including the conditions assumed in building it... will be published elsewhere.' (I insert *italics* to mark hedges, underlining for indications of factuality, and **bold** print to highlight emphasis on novelty or uniqueness.) The use of **novel** is an explicit claim for competitive priority. Specific, immediately, and full details imply certainty that is contradicted by *suggest* (twice here), *postulated*, *possible*, and *assumed*.

This style of hedging has prompted a great deal of study of what various linguists call *appraisal*, *epistemic status*, *evaluation*, *evidentiality*, *intensity*, *modality*, *qualification*, *stance*, or *vagueness* with *downgraders*, *downtoners*, *indirectness*, *mitigation*, *tentativeness*, and *understatement*. One dissertation (Varttala 2001) cites about 320 articles and books. Science writing needs hedges to make its claims appropriately precise and acceptable to the audience, but college composition handbooks still omit hedging or advise against it. Hedging is ignored in most ESL textbooks also, although second-language science students need to learn it because cultural differences make



hedging more a characteristic of English than of other languages (Varttala 2001:276; Hyland 1994, 1996). However, I have found no linguistic analysis comparing hedges in the cited DNA report with those in the five other reports on the same topic at the same time. I have found no analysis of the relationship of hedging to labeled novelty and factuality, which may justify it and contrast with it. Moreover, I have found no comparison of science writing for different audiences that distinguishes daily newspaper readers from readers who have demonstrated an interest in science by selecting a publication dealing with it specifically. To fill these gaps, I compare indications of uncertainty, factuality, and novelty in the six original DNA reports, in a 'learned' academic corpus on various topics eight years later, and in three recent reports of the same paleontological discovery that were published on the same day in newspapers and in the popular and expert sections of a professional journal. I conclude with what leading scientists say about uncertainty.

1. PREVIOUS RESEARCH. Much analysis of advertising and popularizing science focuses on politics, rather than linguistic analysis (e.g. Jasanoff 1990; Nelkin 1987). The pragmatic and communicative functions of specific hedges are not considered here. However, Halliday (1994:354–67) charts how hedges participate in the ideational, interpersonal, and textual functions of Systemic Functional Linguistics. He discusses how modality is often expressed metaphorically; it can be subjective or objective, implicit or explicit, and indicative of degrees of possibility, probability, or certainty. In a widely cited study, Latour and Woolgar (1979) list five degrees of certainty but conclude that the actual process of constructing facts is difficult to detect. Both Varttala (2001) and Hyland (1994, 1998) conclude that it is also difficult to quantify the indications of tentativeness. Varttala's dissertation at the University of Tampere, Finland, analyzes hedging in three fields of science and provides extensive lists of wording in two types of current writing: researchers reporting their own work and scientists popularizing science for readers with college educations and interest in sciences but without expertise in the particular field. He finds that hedging varies greatly according to the audience, the field, and the section of the report. He tabulates as hedges 2.2% of the words for expert readers in medicine and technology, but much more in popular writing: 3.8% in medicine, 3.1% in technology. Economics differs, with 3.1% hedges in expert writing and only 2.8% in popular. In Hyland's analysis of academic research articles in molecular biology, 2% of all the words are hedges, but 3% of the words in Discussion sections hedge (1998:246).

Fahnestock (1986) calls the writing in popular science magazines 'accommodating writing' to distinguish it from writing by and for experts in the field. The differences are much more than 'dumbing down', simplifying vocabulary, or omitting methods. Readers want practical applications or an epideictic focus on the wonders of uniqueness and novelty. For them, the significance must be explained and emphasized, because the public's right to know differs from its ability to understand, she says. Accommodating writing must adjust the presentation of new information to the readers' current knowledge, assumptions, and values. It must adhere to textbook



|                     | Watson & Crick 1 | Wilkins, Stokes & Wilson | Franklin & Gosling | Watson & Crick 2: Implic | Watson & Crick Symposia | Crick & Watson, 1954 |
|---------------------|------------------|--------------------------|--------------------|--------------------------|-------------------------|----------------------|
| <b>Total Words</b>  | 950              | 2020                     | 1839               | 1656                     | 5130                    | 6470                 |
| <b>Hedging</b>      |                  |                          |                    |                          |                         |                      |
| Doubt               | 1                | 0                        | 1                  | 0                        | 16                      | 20                   |
| Qualification       | 4                | 4                        | 8                  | 8                        | 23                      | 22                   |
| Limitation          | 3                | 4                        | 8                  | 10                       | 15                      | 19                   |
| Indefiniteness      | 0                | 1                        | 1                  | 1                        | 1                       | 9                    |
| Tempering           | 16               | 43                       | 32                 | 32                       | 79                      | 117                  |
| Modals              | 8                | 6                        | 22                 | 23                       | 80                      | 85                   |
| Verbs               | 16               | 15                       | 27                 | 33                       | 99                      | 117                  |
| <b>All Hedges %</b> | <b>5.15%</b>     | <b>3.61%</b>             | <b>5.33%</b>       | <b>6.46%</b>             | <b>6.10%</b>            | <b>6.01%</b>         |
| <b>Factuality %</b> | <b>2.10%</b>     | <b>1.93%</b>             | <b>2.56%</b>       | <b>3.20%</b>             | <b>2.07%</b>            | <b>2.13%</b>         |
| <b>Novelty %</b>    | <b>0.84%</b>     | <b>0.24%</b>             | <b>1.03%</b>       | <b>1.27%</b>             | <b>1.25%</b>            | <b>1.05%</b>         |
| <b>Total %</b>      | <b>8.09%</b>     | <b>5.79%</b>             | <b>8.92%</b>       | <b>10.93%</b>            | <b>9.42%</b>            | <b>9.20%</b>         |

**Table 1.** *The first six DNA papers.*

definitions and what is accepted as fact. It replaces procedural data with a brief summary of results and an emphasis on their effects. It omits contradictory evidence, details, and qualifications such as the small size of a sample. Its wording emphasizes certainty. It may exaggerate. It often adds interviews with the original researcher or other experts who inject controversy or speculate orally with claims which no one is ready to commit to paper for peer evaluation. Because accommodators do not fear competition, criticism, or refutation by colleagues, Fahnestock holds that accommodating writing does not hedge, although other researchers doubt that conclusion. The doubt may relate to her earlier date or more likely the difference between stories in *Newsweek* and articles for readers with a demonstrated interest in science. She calls for further research on communicating similar subject matter to dissimilar audiences.

2. QUANTITATIVE ANALYSIS OF SCIENCE WRITING. I distinguish newspaper articles from the accommodating popular writing for readers who have chosen a science publication although they lack expertise in the fields covered. A third type of article is the research report by researchers for other experts in their field. This forensic genre of original reports presents observations for readers who can recognize their significance without being told. It includes the details of experimental procedures that are beyond the interest and understanding of popular audiences. It candidly admits weaknesses and the need for further research before other specialists do. It may lay a claim that requires a lifetime of supporting work. It has valid reasons to speculate and qualify in the many ways listed in **Table 1**. This table reports the frequencies of different types of hedges in each of the six original DNA reports. It also lists the percentages of indications of factuality and novelty.

|                     | 1953-54      | 1961         | Paleontology, 2001 |             |             |
|---------------------|--------------|--------------|--------------------|-------------|-------------|
|                     | 6 DNA        | SUSANNE      | Newspaper          | Popular     | Expert      |
| <b>Total Words</b>  | <b>18065</b> | <b>18060</b> | <b>734</b>         | <b>1063</b> | <b>1496</b> |
| <b>Hedging</b>      |              |              |                    |             |             |
| Doubt               | 38           | 64           | 0                  | 1           | 3           |
| Qualification       | 69           | 62           | 0                  | 1           | 2           |
| Limitation          | 59           | 21           | 2                  | 0           | 1           |
| Indefiniteness      | 13           | 55           | 1                  | 6           | 14          |
| Tempering           | 319          | 267          | 1                  | 7           | 5           |
| Modals              | 224          | 120          | 8                  | 3           | 5           |
| Verbs               | 307          | 117          | 3                  | 17          | 21          |
| <b>Hedging %</b>    | <b>5.69</b>  | <b>3.91</b>  | <b>2.04</b>        | <b>3.29</b> | <b>3.41</b> |
| <b>Factuality</b>   |              |              |                    |             |             |
| Certainty           | 206          | 374          | 5                  | 10          | 28          |
| Process             | 61           | 322          | 1                  | 9           | 12          |
| Conformity          | 136          | 136          | 1                  | 7           | 22          |
| <b>Factuality %</b> | <b>2.30</b>  | <b>4.61</b>  | <b>0.95</b>        | <b>2.45</b> | <b>4.14</b> |
| <b>Novelty</b>      |              |              |                    |             |             |
| Difficulty          | 21           | 19           | 12                 | 12          | 8           |
| Newness             | 20           | 19           | 1                  | 4           | 0           |
| Rarity              | 87           | 68           | 2                  | 5           | 9           |
| Intensives          | 60           | 91           | 7                  | 7           | 12          |
| <b>Novelty %</b>    | <b>1.01</b>  | <b>1.09</b>  | <b>3.00</b>        | <b>2.63</b> | <b>1.94</b> |
| <b>Total %</b>      | <b>8.99</b>  | <b>9.61</b>  | <b>5.99</b>        | <b>8.37</b> | <b>9.49</b> |

**Table 2.** Fifty years of science writing.

The hedges that express the greatest degree of uncertainty are those that indicate withdrawn information or doubted or contradictory evidence, using words such as *anomaly*, *unexpected*, *instead*, *nevertheless*, *yet*, and *contrary to expectations*. Qualifications may be introduced with function words such as *although*, *when*, *but*, and *however*. Limitations appear in clauses beginning with *if* or *unless*. Indefiniteness is often expressed with adjectives suggesting approximation or possibility: *general*, *some*, *about*, *within*, *other*, *tentative*, *analogy*. Many words for tempering are adverbs: *partly*, *most*, *likely*, *frequently*, *often*, *possibly*, *sometimes*, *reportedly*, *perhaps*, *apparently*, *presumably*. The strongest hedges are verbs that project uncertainty, such as *appear*, *assume*, *expect*, *minimize*, *seem*, *speculate*, and *suggest*. Modal auxiliaries are numerous but not the dominant type of hedging assumed by early analysts. In order of descending frequency in Varttula's research (2001), they include *may*, *might*, *could*, *should*, *would*, and *can*.

Types of indications of factuality and novelty are specified in **Table 2**. Certainties are supported with facts, data, evidence, and numbers; these are counted only once regardless of their length. Information is often labeled as specific, correct, identical,

or demonstrated. Detailed explanations of processes are convincing and often accompanied by formulas and wording such as method, examination, analysis, application, use, caused, or obtained by. Rational, anticipated conformity may be associated with expressions such as expected, consistent with the paradigm, support, conclude, deduced, thus, therefore, thereby, arising from, normal, realize, or compared.

Novelty grabs the interest of the uninitiated when it is expressed with terms that communicate strangeness and amazing variations; novelty benefits competitive scientists when it supports a claim to priority. Extreme difficulties are novelties that involve horrible problems and challenges; they may be explained with a wide variety of descriptions and requirements such as **expense** and **time**. Newness can be labeled **now**, **novel**, or **recent**. Terms that emphasize rarity include **unique**, **complete**, **except**, **only**, **never before**, and **unusual**. Intensives include extremes and **very**, **much**, **more**, and **already**.

I omit citations and other references because they may indicate either factuality or sources of what the researchers question or refute; quotations also can present either support or controversy. Despite the frequency of controversy in science writing, I did not count it because it is associated with no distinctive wording other than what is already listed.

3. ANALYSIS OF THE SIX ORIGINAL DNA REPORTS. In a Norton critical edition, Stent (1980) reprints Watson's complete 1968 book *The Double Helix*, as well as the six original DNA research articles, fourteen reviews, and several other perspectives. Three of the articles originally appeared on succeeding pages of the British journal *Nature* on April 25, 1953, all dated as received on April 2. The first paper is the celebrated brief one by Watson and Crick quoted above, titled 'A Structure for Deoxyribose Nucleic Acid'. It includes a drawing of the double helix and flows onto a second page, which begins a report by researchers in another lab, Wilkins, Stokes, and Wilson. Both reports promise fuller accounts later. The second one presents what it calls 'preliminary' evidence. Its lowest percentages of hedging and novelty and somewhat higher proportion of factuality, as listed on **Table 1**, reflect the traditional stereotypical style; these researchers were out of the communication style loop. They refer to authors of the third paper, Franklin and Gosling, who cite two of their own forthcoming articles. Wilkins, Stokes, and Wilson were at King's College, but Watson and Crick were at Cambridge. Rosalind Franklin left Cambridge before publication.

Watson and Crick had a second paper, 'Genetical Implications', in *Nature* a month later, written after they had seen Franklin's X-ray evidence and papers. The word 'Implications' in its title anticipates hedging. It has the most indications of uncertainty—6.46% of its words—and of factuality and novelty. Their 'Structure of DNA' was a long presentation at the Cold Spring Harbor Symposia in New York; it was second highest in hedging and novelty but second lowest in factuality. The last of the six papers is Crick and Watson's 'The Complementary Structure...' in *Proceedings of the Royal Society* in 1954, a year later.

The most frequent hedges in these reports are verbs projecting uncertainty and adverbials that temper a statement. Modal auxiliaries are third in frequency. Variations in hedging, factuality, and novelty are parallel: increases in hedging are matched by almost equivalent increases in novelty. Their percentages total nearly 11% of the words in Watson and Crick's 'Implications' paper, while the total in the traditional Wilkins-Stokes-Wilson report is less than 6%. **Table 1** tabulates the six papers separately, and **Table 2** combines them.

4. ANALYSIS OF THE SUSANNE CORPUS OF ACADEMIC WRITING. How much does general academic writing hedge? To answer this question I did a similar analysis of the 'learned' section of the SUSANNE corpus, a subset of the Brown Corpus of American English, named with an acronym for 'Surface and Underlying Structural ANALyses of Natural English' (Sampson 1995). This subset (genre category 'J') contains technical and scholarly prose published in the United States in 1961, eight years after the first DNA reports. Omitting one third of the subset approximated the length of the six DNA reports. **Table 2** shows that they have similar total codings, averaging about one for every ten words. They show a similar emphasis on novelty (1% of total words, 11% of the indications tabulated for each corpus). Notably, SUSANNE has twice as much factuality as the DNA reports but evens up the total counts with less hedging. These figures reflect the emphasis is on factuality in general academic writing, in contrast to the new style of heavily hedged DNA reports.

Perhaps SUSANNE does not hedge as much as the DNA reports because of the truly revolutionary nature of the DNA reports, but another reason for difference is that SUSANNE contains material from a variety of fields, and it mingles reports on a particular research project with discussions of the established knowledge in whole fields for a variety of audiences. Furthermore, its samples are random cuts of about 2000 words, usually from the middle, omitting places where hedges are most frequent: beginnings consider weaknesses of previous findings, and endings qualify results and suggest further research needed.

5. ANALYSIS OF CURRENT RESEARCH REPORTS. Valid comparisons limit variation to only one factor of topic, date, and audience. No current genetics work is really comparable because the field is forever changed. An alternative comparison involves analyzing current reports of a specific discovery as published in an original research report for experts, in popular writing for readers interested in science, and in the stories in daily newspapers. The front sections of 200-page weekly journals such as *Nature* (where the first DNA articles appeared) and *Science* (the journal of the American Association for the Advancement of Science) offer scientists in any field overviews of some of the longer research reports printed in the larger back sections for expert readers. The overviews resemble the often-studied longer articles in popular magazines such as the monthly *Scientific American*. I collected several sets of articles on the same discoveries for three different audiences. They are not sufficient for large generalizations, but a qualitative analysis of one set can illustrate characteristics of

examples of current writing for different audiences. Three articles on a paleontology project were all published on February 23, 2001, in the popular and specialized sections of *Science* and in an Associated Press release to daily newspapers. I shall quote the headline or title and the first sentences of each to illustrate the style before I summarize the entire article. **Table 2** lists tabulations of each type of wording and percentages of hedging, factuality, and novelty in these three articles.

An Associated Press story in the *Houston Chronicle* has the headline, 'Clues found to **"mother of all extinctions"**'. The lead researcher, a geochemist, is quoted dramatically in a boxed inset quotation, 'This was the **mother of all extinctions**. What makes it so **remarkable** is that **virtually all** marine life and a good portion of land life forms were eliminated in a **very short** period of time.' The short first paragraph of the story itself reads, 'History's **most devastating** extinction, the death of almost 90 percent of life on Earth, *may have been triggered* by an asteroid or comet like the one that much later killed off the dinosaurs.' The article treats the discovery as an exciting new explanation of an ancient horror that killed most of the life on earth. The newspaper names the evidence found but does not explain it or the process of finding it or other complex concepts. It says researchers 'concluded that a space rock... smashed into the Earth' and discusses possible effects of large rocks doing that. An independent scientist emphasizes its novelty. The story has few indications of certainty and slightly more hedging modals, but 3% of its vocabulary portrays exciting difficulties with terms that do not appear elsewhere: **smash, kill mechanisms, dramatic changes, the great dying**.

A section in *Science* headed 'News of the Week' introduces to its general readers an alternative analysis of a mystery that is impressive and novel, but not fully convincing (Kerr 2001). It is headed, 'Whiff of Gas *Points to Impact Mass Extinction*', and begins, 'Two hundred fifty-one million years ago, as the Permian period gave way to the Triassic, Earth experienced its **greatest mass extinction** ever. Ninety percent of all marine species, including the last of the trilobites, disappeared, while on land **per-vasive extinctions** opened the way for the rise of the dinosaurs. But despite the **magnitude of this 'mother of all mass extinctions'**, its cause has remained **mysterious**.' This overview later assumes some knowledge of chemistry but not much paleontology. It provides background guidance missing in the newspaper account, explaining the discovery of material that could have the theorized effect, but it does not discuss the research procedures. It arouses a little doubt and controversy by interviewing outside authorities who are supportive but not yet fully convinced. The first paragraphs focus on novelty while the last ones use factual terms, but it hedges everywhere.

The research report itself has about 2500 words in six full columns of text (Becker et al. 2001). Not analyzed were three large graphs and a full page of about 1800 words of 'References and Notes' in smaller print, making it 3½ pages long. From its title onward it focuses on factuality and evidence: 'Impact event at the Permian-Triassic boundary: Evidence from extraterrestrial noble gases in fullerenes'. Below names of five authors is the abstract:

The Permian-Triassic boundary (PTB) event, which occurred about 251 million years ago, is marked by **the most severe mass extinction** in the geologic record. Recent studies of some PTB sites indicate that the extinctions occurred **very abruptly**, consistent with a catastrophic, *possibly* extraterrestrial, cause. Fullerenes (C60 to C200) from sediments at the PTB contain trapped helium and argon with isotope ratios *similar* to the planetary component of carbonaceous chondrites. These data imply that an impact event (asteroidal or cometary) accompanied the extinction, as was the case for the Cretaceous-Tertiary extinction event about 65 million years ago.

The report presents chemical evidence and describes the geology that make an extraterrestrial impact possible. It concludes, 'Our results are consistent with...' Indications of factuality lead throughout the report. Indications of novelty are fewer and concentrated in the introduction and closing, where most of the hedges occur. The report lacks the dramatic terms used elsewhere. Passive verbs abound, but six times an active verb follows *we*.

6. WHY DOES SCIENCE WRITING HEDGE IN DIFFERENT WAYS? All of these reports hedge. Both the newspaper story and the accommodating popular article quote outside authorities who express interest in the findings but are not fully convinced. The newspaper story displays the expected proportions of factuality least, hedging more, and novelty most; the overview includes all three, with hedging leading; and the research report has the most factuality and significant hedging but least novelty. These are clearly three different genres.

**Table 2** compares current paleontology reports with the DNA and SUSANNE corpora. SUSANNE's academic writing in 1961 has less hedging than the DNA research, but it parallels the current expert paleontology report in having more factuality and less novelty. The paleontology overview has nearly as much hedging as the expert report does (3.29% vs. 3.41%), although it has significantly less factuality (2.45% vs. 4.14%). The DNA reports have more hedging than any of the other materials examined here or researched by Vartala or Hyland. After the widely cited hedging in the first DNA report, the amount of hedging increases in later DNA reports and exceeds percentages elsewhere. Indications of novelty in all three current paleontology reports double or triple those in the earlier writing examined. Novelty accounts for only about 1% of the words in the academic and expert writing examined from 40–50 years ago, but for 2% of the words in the current report for experts, and 2.63% to 3.0% in the current popular and newspaper reports. In all the material examined, focus on novelty is the inverse of the readers' knowledge of science, and factual indications correlate with the amount of knowledge the readers have.

The newspaper has the least need to hedge. The DNA hedging style may have a greater impact on the modern field of accommodating writing. When hedging is established in the growing field of popular overviews, educated non-specialized readers come to expect it and the situations that motivate it. If these analyses are

representative, hedging now has a role in popular accommodating writing, which is becoming more abundant and more influential.

Hedging for doubt is not completely new. In 1661, when experimentation was replacing alchemy, Robert Boyle led the way into hedging and felt compelled to defend his use of expressions such as *perhaps*, *seems*, and *not improbable* (Atkinson 1999:103). His style became common in the early publications of the British Royal Society but was later dismissed as the genteel modesty of wealthy amateurs when objective measurement and professionalism arose (Atkinson 1999:145–66). Rosalind Franklin was an independent thinker whom other DNA researchers despised and ignored (Watson 1968:15), but her heavy hedging reflects sincere doubts because she had missed an implied relationship. Despite the hedging, her student assistant Aaron Klug (1968), who later became president of Britain's Royal Society, believes that her contribution was the closest to the correct structure.

Because scientists must establish priority in order to claim patents, they may rush to publish before they are certain. However, science must hedge for reasons that are more basic than priority, politics, conniving, or relationships with the current paradigm. When science is news, it is still somewhat questionable. Various versions of an explanation must be considered to reach consensus. All of the doubts and alternatives must be cleared up before a matter is settled in textbooks. Current uncertainties abound, ranging from census counts and the number of chemical elements to the description and behavior of neutrinos and what is called the 'Standard Model' of particle physics. In July, 2004, the famed Stephen Hawking made headlines worldwide when he told a conference of scientists that his own alternative calculations convinced him to deny what he had claimed for thirty years, that black holes destroy the information they swallow. Researchers anticipate change, and their writing reflects that possibility. Scientists explore possibilities.

Scientists know that doubts are essential to research, which is exciting and fun. Novelties, extremes, and controversies are exciting. The uninitiated may not realize how much scientists enjoy research; that is why they persist, regardless of practical value. Nobelist Steven Weinberg (1992:74) writes in his *Dreams of a Final Theory*, 'Science is too much fun to sit around wringing our hands because we're not certain about things.' A collection of the short works of another renowned Nobelist, Richard Feynman, is titled *The Pleasure of Finding Things Out* (1999). Feynman says scientists must doubt, and they must report everything that could invalidate their research. They cannot evaluate evidence when they already know the answer, but they must write about it. He says that the purpose of knowledge is to appreciate wonders more. One effect of accepting uncertainty is that scientists develop humility and often a strong religious faith, in contradiction to the popular stereotype that ignores the imagination that scientists must apply.

Scientists are becoming real people in contemporary media, and science writing now may reflect the personal role of scientists. Often the only information accessible to the administrators who control funding is hedged. It has political effects, as when bureaucrats cite 'scientific uncertainties' as an excuse to reject environmental regu-



lations (Gibbons 2001; Kaiser 2001). Pedagogy is changing too. Composition handbooks are catching up with the field and beginning to allow technical writers to refer to themselves and to choose between active and passive verbs. A new custom textbook for technical writing courses explains hedging (Penrose & Katz 2001).

This research project moved from an objective statistical corpus count of hedges in a 1961 corpus to a qualitative analysis of current writing. It had to develop. Science is a developing human endeavor.

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## NEGATION IN HORTATORY DISCOURSE

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HORTATORY DISCOURSE aims at influencing behavior of an addressee, as in sermons and words of advice. Its intent may be expressed by a performative verb, '*propose*, i.e. *suggest, urge, command*' (Longacre 1996:15). Along with narrative, hortatory discourse is a basic type of discourse, universal to all languages and cultures, and includes four macro-level elements in its schema: the credibility or authority of the speaker, a problem/situation, the command, and motivation. This study explores the functions of negation in written hortatory discourse in naturally occurring texts, noting the distribution of negative and positive imperative forms<sup>1</sup>.

Much literature studies negation from semantic, logical, morphosyntactic, and typological perspectives. This paper is from a functional perspective, i.e. the functions of negation in its discourse and pragmatic context. Some functional studies of negation dealing with narrative and expository discourse have been done and are reviewed below, but to my knowledge no study has been done on the functions of negation explicitly in hortatory discourse. Tottie's book on negation (1991), while primarily dealing with variation between forms like *not* versus *no* in English conversation and exposition, presents a chapter on the pragmatics of negation. Tottie proposes rejection and denial as two basic functions of negation. Rejection, which occurs mainly in dialogues, is not relevant to our study of monologue texts. Of the two types of denials, i.e. denials of explicitly stated assertions and those of implicit information, the latter type is most frequent and interesting in a study of written monologue texts. Pagano's study (1994) on English expository data is exclusively on implicit denials. She reports four primary functions of negation: denials of background information, text-processed information, unfulfilled expectations, and contrasts.

Hwang (1992b) and Yamada (2003) have studied functions of negation in narrative. With illustrations from narrative texts in English and Korean, Hwang notes that negation is an explanatory device to tell what did not happen, contrary to expectation (signaling a break from a frame or a script), based on shared information from the text, context, or culture. Beyond this basic function are found global functions, such as marking a turning point in the plot or a high tension point, such as a peak. Yamada's book applies previous findings to personal experience narratives in Japanese and reports a variety of both local and global discourse functions. He views contrast as the basic function of negation, and denial as a universal pragmatic feature, with a wide range of functions such as marking a problem, a turning point, a high tension point, or moral evaluation (Yamada 2003:404).

Urging that we use ‘real examples in real contexts for meaningful pragmatic studies of negation’, as I do, Jordan (1998) argues against the belief that negation is less important and less informative, and proposes that positive and negative statements serve different purposes with regard to informational levels. He presents examples of one-, two-, and three-part structures such as denial and correction, and thesis-concession-rebuttal, using English examples of mostly expository discourse.

Givón (1993) points out that negation is a confrontational and challenging speech act of denial of discourse presupposition. That is, it tries to correct the hearer’s mistaken beliefs. This speech act of denial may be to provide background and explanatory information in narrative and expository discourse as shown in previous studies. See Grimes’ (1975) discussion of negatives in narrative marking a type of non-event, collateral information. Hwang and Yamada, however, show that some negatives contribute to the foreground in narrative by marking a turning point on the storyline.

This paper shows that the basic function of negation as denial of expectation is true of background information in hortatory discourse as well. But it claims that negatives contribute to the mainline of exhortation in hortatory discourse in a crucial way that is not parallel to any other type of discourse<sup>2</sup>. Hortatory discourse employs command forms<sup>3</sup> on its mainline in contrast to narrative and expository types, in which statements occur on the mainline to make assertions. Procedural discourse of a simple type, such as a recipe or an instruction, may use imperatives on the mainline as well, but the function of negation seems to be more restricted, as in a warning in a procedural step, e.g. *Don’t start to cook until the ingredients are well marinated*.

Negative imperative constructions may issue a prohibition, urging the avoidance of undesirable behavior. They sometimes reinforce a positive imperative, as in: *Don’t do X but do Y*. A negative-positive pair may actually paraphrase each other. Other negative imperatives occur by themselves, prohibiting commonly found behavior, as in *do not criticize* and *do not forget*.

The sources for the present discussion are written texts in English and Korean, from newspaper and magazine advice articles, and two New Testament books of the Bible<sup>4</sup>. Most of the negatives in our texts are sentential negations, with the scope of negation an entire clause.

1. NEGATION IN ENGLISH ADVICE ARTICLES. The first text comes from the Business section of the *Dallas Morning News*, carrying the headline ‘Don’t get bit’. In the upper right-hand corner there is a section with five bulleted points.

(1) **Guarding against fraud:** Here are ways to protect against investment fraud<sup>5</sup>.

- [1] • Always check out the investment and the person promoting it.
- [2] • **Don’t invest** in something you **don’t** understand.
- [3] • Take your time learning about the investment.
- [4] • **Don’t be pressured** into turning over your money immediately.
- [5] • If something sounds too good to be true, it probably is.

- [6] • **Don't invest** based solely on the recommendation of a member of an organization or religious or ethnic group to which you belong.

The thesis of this short text is stated in [1]: *Always check out the investment and the person promoting it*. The negative sentence in [2] is a paraphrase of the thesis. [3]–[4] amplifies the thesis regarding the time factor (*take time*), and [6] further amplifies the thesis regarding personal relationship. The generic, common sense statement in [5] may be viewed as the reason for [6], which gives the second amplifying command in negative form<sup>6</sup>.

(2) Thesis: Negated Antonym Paraphrase ¶

Thesis: [1] Always check out the investment and the person promoting it.

Paraphrase: [2] **Don't invest** in something you **don't** understand.

Amplification 1: Negated Antonym Paraphrase ¶

Thesis: [3] Take your time learning about the investment.

Paraphrase: [4] **Don't be pressured** into turning over your money immediately.

Amplification 2: Reason ¶

Reason: [5] If something sounds too good to be true, it probably is.

Thesis: [6] **Don't invest** based solely on the recommendation of a member of an organization or religious or ethnic group to which you belong.

There are two positive imperatives, *check out* and *take your time*, and three negative imperatives, *don't invest* twice and *don't be pressured*. The paraphrase relations between [1] and [2], and between [3] and [4] can be called a negated antonym paraphrase (NAP) in a broad sense<sup>7</sup>. Negatives function here to paraphrase and reinforce what is given in positive imperative. That is, [2] and [4] do not deny what precedes them, but say the same things, in a different way, using negatives. These negative sentences, however, may occur on their own without the positive imperative sentences, in which case they function to deny or warn against careless behavior, i.e. investing in things that we don't understand. Note that the negative imperatives may strike the reader more strongly than the theses in positive. That is, the reader may take more notice of the paraphrases in negative form. [6] certainly is a strong warning against the common tendency to trust someone in our own group.

Let us compare the following two extracts, with only positives in (3) and with only negatives in (4):

(3) **Guarding against fraud:** Here are ways to protect against investment fraud.

- Always check out the investment and the person promoting it.
- Take your time learning about the investment.
- If something sounds too good to be true, it probably is.

- (4) **Guarding against fraud:** Here are ways to protect against investment fraud.
- **Don't invest** in something you **don't** understand.
  - **Don't be pressured** into turning over your money immediately.
  - **Don't invest** based solely on the recommendation of a member of an organization or religious or ethnic group to which you belong.

Even without considering the third point in each group, which are not paraphrases, negative imperatives may be more weighty and informative. A similar point is made in Jordan (1998:706–7) about a negative statement. In certain contexts, as in *The captain was NOT drunk last night*, he states that 'a clear negative statement had much more power than the positive, because it implied that the positive (the captain's drunkenness) is the usual or normal situation', and that it 'contains more information'. The negative imperatives in our text may similarly have 'more power'.

The investment article itself appears on two pages and includes both positive and negative imperatives as well as negative statements. The introductory part is in (5).

- (5) **Don't get bit:** Con artists are always looking for an opportunity to strike. Common sense says that if something sounds too good to be true, it probably is... Common sense **isn't** your only tool. The securities board and other regulators offer ways to check out those who are soliciting your money.

The headline in negative **Don't get bit**, which is certainly eye-catching, is followed by a sentence about con artists to present the problem. The imperative title is more like a motivation for this hortatory text than a command, i.e. 'To not get bit in the current situation with con artists, do as in the following commands'. The second sentence starting with common sense, *Common sense isn't your only tool*, is in the negative, since the first sentence might imply that common sense suffices. The first sentence is a concession to the second in negative, which denies a possible inference that it is the only tool. The semantics of negation commonly involves denial of expectation, i.e. frustrated expectation of many varieties, as in this case.

In the body of this article, there are five negative imperatives (*don't buy, don't be taken, don't let, don't hesitate, never invest*) and eight positives (*make sure, ask, watch, watch out, check, make sure, find out, ask*). There is an additional negative in an *if*-clause (*if you don't understand*) and two more in an explanation near the end (*Just because an investment is registered with state regulators doesn't mean you won't lose money in it*). The explanation is followed by the final positive imperative sentence, *Just ask Enron Corp. shareholders*, which is not a command to act but a rhetorical command to make a point by adding a well-known case.

Similar examples of negative antonym-like paraphrases are found in an article on health, 'I am afraid I have bad news... Twelve steps to handle a disturbing diagnosis'. The steps are not contingent upon previous ones, as is the case with procedural discourse; rather, they give advice whose steps are only roughly temporally organized.

The negative imperative occurs before the positive in (6)b, and in the other four the paraphrases are in a positive-negative order.

- (6) a. Start building your team.  
       **Don't try** to get through this battle alone.  
       b. **Don't let** a gung-ho doctor rush you...  
           Whenever possible, take a few days... to ponder all your options  
       c. Invest 40 bucks in a microcassette tape recorder....  
       **Don't even think** about trying to write while you're listening to a doctor talk  
       d. Tap two brains.  
       **Don't hesitate** to get a second opinion—and **don't feel** uneasy about telling  
       e. Get educated, **not distraught**.

The remaining seven steps have commands only in the positive; and in one there are two positive imperatives: *Make hurried doctors listen... Remember that some of the best physicians are the worst communicators.*

In this text, the ratio of negative-positive commands is 1:11 in main steps as stated above, 8:24 in sub points, and 9:35 total.

Not all main points in advice may be a command. In a text discussing how to teach children positive self-image through fitness, one of the six main points is in a negative statement, *Parents **aren't** the only adults that influence their children.* It is immediately followed by a positive command as in other points: *Set the 'no diet-talk' rule mentioned above for all adults that are around your children.* Two points in a positive command are followed by a negative command.

- (7) a. Establish a 'no diet-talk' rule.  
       When your children are nearby, **DON'T talk** about dieting or how fat you feel!  
       b. Teach your children to include physical activity as part of their daily routine.  
       *But* **don't force** them to exercise.

The negative command in (7)a explains the rule, with capital letters for DON'T and an exclamation mark. So the negative command here is not just paraphrasing the positive but supplying necessary information to carry out this first main point. The second pair in (7)b, coupled with the conjunction *But*, is a case of denial. After a command, it denies implicit expectation regarding the extent of exercise. It illustrates a typical function of negation, of the concession-denial type, involving frustrated expectation between two sentences.

In this section we have noted from three English articles that negative imperatives crucially contribute to the mainline of exhortation. A negative imperative may occur by itself or in a pair with a positive imperative to reinforce the advice, by paraphrasing or amplifying, or to deny expectations that may arise from the positive sentence.

2. NEGATION IN A KOREAN ADVICE ARTICLE. In the hortatory text called ‘The working Person’ with twenty-eight sentences (see Hwang 1992a for full text and discussion), only one overt imperative, which is positive, occurs, and that in the very last sentence. Thus there is no negative imperative, but negative statements occur throughout the text. A long expository section presents a situation/problem in [1]–[21] describing two types of people, those who work and those who meddle and create work. In describing working people in [3]–[8], two sentences show NAP with the second one in the negative: ‘They devote mind and body to their work’ [4] and ‘They do **not meddle** with other’s work’ [5]. In the much longer section concerning meddlers ([9]–[21]) two sentences are related in paraphrase, with the first one in negative: ‘Thankfully, I regard that the number of such people **is not high**’ [18] and ‘They are the minority’ [19]. What is interesting is that three sentences with negatives ([12]–[14]) occur in a row, perhaps to highlight the negative characteristics of this undesirable group: ‘If things **don’t fit** their minds even a little, they complain right away. They **cannot feel** satisfaction in their work. When the work **does not come out** well, they think the responsibility **lies not** with them but lies with others.’ This is analogous to the occurrence in narrative of negatives in a cluster at the peak or high point of tension; but with only one example, and only in Korean, we can only speculate that it is a possibility in hortatory discourse as well.

The motivation section ([22]–[26]) switches from expository to hortatory, and the deontic modal *should* occurs twice in ([22]–[23]), stating that ‘there should be many working people.’ Then another point is made after a concession in two negative statements: ‘Although the world is not perfect, those who work hard feel the value of life.’

(8) Concession: Amplification ¶

Thesis: [24] The world **is not perfect**.

Amplification: [25] The society in which we live, the place we work, and the country we belong to **are not perfect**...

Thesis: [26] *But* those who are devoted to work feel the value of life ...

The concession stated in the negative makes the thesis in [26] much stronger; that is, their feeling toward life is not due to perfect situations. While the negation involving a concession-denial would have negation in the denial part (a common function of negation), as in (7)b, [24]–[26] in (8) show that negation may occur in the concession part with the thesis in positive. This Korean hortatory text does not contain negative imperatives, but our analysis shows that negative statements may also have a reinforcing function by paraphrasing and adding a concession, with a possible function of marking a high tension point when several negatives occur in a cluster.

3. NEGATION IN BIBLICAL TEXTS. Two texts are chosen to study how negatives function in New Testament hortatory texts, 1 John and Colossians, for which discourse-level analyses are available. Longacre’s analysis shows that 1 John is a hortatory text because overt command forms are basic to the text, although only 9% of main clause



verbs are command forms, i.e. ‘imperatives, hortatives (‘let us love’), jussives (‘let him love his brother also’), and ‘ought’ forms’ (Longacre 1992:278). While these forms are used for the main exhortations, there are also forms of mitigation in grammatical subordination or subjunctive verb forms, such as a purpose clause (‘so that you may not sin’ in 2:1) and conditional clause (‘if we confess our sins’ in 1:9). For ease of discussion, our analysis is based on the NIV in English. Six negative command forms occur in 1 John:

- (9) 2:15 **Do not love** the world or anything in the world.  
 3:7 **do not let** anyone lead you astray.  
 3:12 **Do not be** like Cain, who belonged to the evil one and murdered his brother.  
 3:13 **Do not be surprised**, my brothers, if the world hates you.  
 3:18 **let us not love** with words or tongue **but** with actions and in truth.  
 4:1 **do not believe** every spirit, *but* test the spirits to see whether they are from God, because many false prophets have gone out in the world.

The first command form in the book occurs in 2:15 as a negative imperative prohibiting us from behaving normatively by loving the world. In Koine Greek, 3:12 is a verbless sentence, ‘Not like Cain, who belonged to...’, but is more naturally translated both in English and Korean with a negative imperative verb. In 3:13, the imperative is not to direct us to a correct, proposed behavior, but is a kind of rhetorical device to draw our attention. In 4:1 the verbs are negated antonyms roughly, *not believe* and *test*, with the negative imperative occurring first. The *not-but* pattern, which expresses a contrast at a glance, is really functioning as a paraphrase at a deeper level. The same pattern in 3:18 might seem to represent a contrast with two pairs of opposition:

- (10) Let us **not love**      with words or tongue  
       *but* (let us love)      with actions and in truth

The verb *love* is used with negation in the first clause, and the positive form of the same verb is gapped in the second and the two *with*-phrases are in opposition. At a much deeper level of meaning, however, we argue that the two are saying the same thing and similar in content. This is especially true in a polarized world with only two possibilities, either ‘with words or tongue’ or ‘with actions and in truth’. Don’t love with X but love with Y, which is the opposite of X.

There are eleven positive command forms: six imperatives (including one cohortative *let us* form), in (11)a (overleaf), and five with deontic modals, *should*, *ought*, and *must*, in (11)b. Comparing (11)a with (9), we can see that there are six each of the positive and negative forms.

- (11) a. 2:24 See that what you have heard... remains in you.  
 2:27 remain in him.  
 2:28 Continue in him  
 4:1 but test the spirits  
 4:7 Dear friends, let us love one another;  
 5:21 Dear children, keep yourselves from idols.  
 b. 3:11 we should love one another.  
 3:16 And we ought to lay down our lives for our brothers.  
 4:11 we also ought to love one another  
 4:21 Whoever loves God must also love his brother.  
 5:16 If anyone sees..., he should pray and God will give him life.

1 John prominently uses polarized concepts such as love and hate, light and dark, along with negation, to present examples of contrast at the intersentential level, as in (12), in which the thesis is elaborated on further in v.11, marked as Thesis' <sup>8</sup>.

- (12) Thesis: 2:9 Anyone who claims to be in the **light** but **hates** his brother is still in the **darkness**.  
 Contrast: 2:10 Whoever **loves** his brother lives in the **light**, and there is **nothing** in him to make him stumble.  
 Thesis': 2:11 But whoever **hates** his brother is in the **darkness** and walks around in the **darkness**; he does **not** know where he is going, because the **darkness** has blinded him.

In (13), a contrast between two groups of people is made in positive-negative statements, after *We are from God* in 4:6a:

- (13) Thesis: 4:6b and whoever knows God listens to us,  
 Contrast: 4:6c but whoever is **not** from God does **not** listen to us.

1 John, in the Revised Version of the Korean Bible, reveals similar patterns of usage and frequency of negative and positive commands. Korean includes three more positive forms than the NIV. The rhetorical imperative *po-la* 'see-IMP' in 3:1 mirrors the Greek imperative verb *idete* 'see', which is removed in the NIV but retained in the NASV, which is known to be a more literal translation. The pro-verb *ha-ca* 'do-let's', added in 3:18 ('let us not love with words or tongue but Ø with actions and in truth'), is required in verb-final Korean while it is gapped in head-initial Greek and English. Finally, in 5:16, what is expressed in the NIV as *should pray* is given as *kuha-la* 'seek-IMP' which is more natural after a long conditional clause. The Korean deontic modals used correspond to English ones.

In Paul's letter to the Colossians, there are far more positive command forms than negative ones, in contrast to 1 John, in which there are six of each. The ratio in Colossians is 33:5, or 34:5 when we combine one occurrence of deontic modal

*must* in 3:8. As expected, command forms do not occur in the preliminary sections of setting, problem, and credibility of author, but they occur in exhortation and motivation sections (2:6-4:6) as well as in the final greetings (4:7-18)<sup>9</sup>. The first imperative is found in 2:6 *So then, ...continue to live in him*, and the next one in 2:8 is positive in command but with a negative component, both in Greek and NIV: *See to it that no one takes you captive*. Some versions translate this as a negative imperative, e.g. **Don't let anyone fool you** in CEV. The final imperative in 4:18 *Remember my chains* (in NIV and Greek) is translated as **Do not forget** (in TEV and CEV). No doubt negative imperative is chosen for impact. The five negative imperatives are as follows:<sup>10</sup>

- (14) 2:16 Therefore **do not let** anyone judge you
- 2:18 **Do not let** anyone... disqualify you
- 3:9 **Do not lie** to each other
- 3:19 **do not be harsh** with them
- 3:21 **do not embitter** your children

We do not find the NAP in negative-positive pairs we see in 1 John, except for one possible NAP in 3:19: *Husbands, love your wives and do not be harsh with them*. The two commands are not exact paraphrases of each other, but we can assume that the two behaviors, loving and not being harsh, go together and that they form loose paraphrases.

The imperative verb *set* in 3:2 is gapped in the second part: *Set your minds on things above, not on earthly things*. This verse is translated in Korean with paired positive and negative imperative verbs which occur at the end of each clause: 'set' and 'do not set'. Is this a case of contrast? There are two opposed pairs, one pair in verbs and the other in locative phrases. But the whole sentence sounds more like a paraphrase at a deeper level. If we consider the two behaviors 'setting your minds on things above' and 'setting your minds on earthly things' to be the only possible alternatives, negating one would result in the same behavior.

In 3:18-4:1, imperatives occur with vocatives for different groups of people.

- (15) 3:18 Wives, submit to your husbands, as is fitting in the Lord.
- 3:19 Husbands, love your wives and **do not be harsh** with them.
- 3:20 Children, obey your parents in everything, for this pleases the Lord.
- 3:20 Fathers, **do not embitter** your children, or they will become discouraged.
- 3:22 Slaves, obey your earthly masters in everything; ...
- 4:1 Masters, provide your slaves with what is right and fair...

The two that are negative (**do not be harsh** in 3:19 as a loose paraphrase of love, as discussed above, and **do not embitter** your children in 3:21 without a positive imperative) seem to refer to more specific behaviors, possibly showing more delimitation in the case of negative imperatives.

4. CONCLUSION. From several naturally occurring texts, we have noticed that at the global level of an entire text, negation functions to mark the mainline of hortatory discourse, prohibiting behaviors that are commonly expected in the background of text and culture. This prevalent function of momentous negation, I believe, is unique to hortatory discourse. There is also the possibility of marking a high tension point with the multiple occurrence of negatives. In the Korean text, the problem section contains three statements in a row with negatives, possibly heightening tension.

At the local level of paragraph context, negation is frequently used to paraphrase a positive sentence. Such paraphrases involving negated antonyms function to strengthen a positive command or statement. There are numerous examples of this type in both English and Korean texts and in Biblical texts. Perhaps the most prevalent use of negation (in a variety of discourse types) is for frustrated expectation or concession, such that when *p* occurs *q* is expected—textually, contextually, or culturally—but *q* doesn't occur and something else, a surrogate, occurs instead. Hence the use of negation to deny that *q* occurred. The third type of relationship is contrast, which is what Yamada considers to be the basic function of negation. When two referents are involved as subjects, contrast is clear, as in *she likes coffee, but he doesn't* and in (12)–(13). In second-person imperatives, the addressee is the subject, and what might seem to be a contrast turns out to be a paraphrase with the same subject referent *you*, as in (10). In summary, negation in hortatory discourse shows a variety of functions in local and global contexts, and indeed one may claim it to have more power in its use, given the element of expectation that is frustrated and denied.

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- <sup>1</sup> I express my thanks to Les Bruce, Marlin Leaders, and Bill Merrifield for their comments on earlier versions of the paper. The term *hortatory* does not refer to a particular grammatical form in this paper but to a type of discourse, which has values of [+ Agent orientation], [– Contingent temporal succession], and [+ Projection]. See Longacre (1996, chapter 1) for detailed discussion of discourse typology.
  - <sup>2</sup> Not all hortatory texts make use of negation in such a way. Some texts feature negation more heavily while others may include no example of negation.
  - <sup>3</sup> The 'command forms'—sometimes shortened to 'commands'—refer to a broader category than second-person imperatives and include cohortatives (*let us go*), jussives (*let him go*), and *ought* forms (Longacre 1992:278). In this paper the term command is sometimes used interchangeably with imperative. Thus 'a positive command' is a shorthand expression for 'a command or directive expressed by an affirmative imperative sentence'. Command as a macro-level unit of hortatory discourse may include a variety of directives such as ordering, requesting, advising, and suggesting (Hamblin 1987).
  - <sup>4</sup> To observe different patterns of use and distribution, three English texts and two books of the Bible are studied. As for Korean, only one hortatory text is studied, and further study is needed encompassing a wide range of texts. The standard abbreviations are used to refer to English versions of the Bible: NIV for New International Version, CEV for Contemporary English Version, TEV for Today's English Version, and NASV for New American Standard Version.

- <sup>5</sup> Sentence numbers are added in brackets for ease of reference. Positive imperative verbs are underlined and negative forms are boldfaced throughout the paper.
- <sup>6</sup> Depending on the role [5] plays in the overall structure, alternative analyses are possible, but I believe this analysis is plausible for our purposes and illustrates the functions of negation. As the only indicative mood within a stream of imperatives, [5] may be viewed as a reason for or a comment on [3]–[4], [2]–[4], or even the whole text.
- <sup>7</sup> Longacre (1996:78) describes NAP as ‘one of the closest possible varieties of paraphrase’ with examples like *poor* and *not rich*, and *short* and *not tall*.
- <sup>8</sup> The intersentential or paragraph analyses in (12)–(13) are taken from Longacre (1983).
- <sup>9</sup> See Alaichamy (1999) for discourse analysis of Colossians.
- <sup>10</sup> Three negative imperatives embedded in a question in 2:21 are not included here: *why... do you submit to its rules: ‘Do not handle! Do not taste! Do not touch!’*

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## WHAT IS 'TRULY FEMININE' IN THE JAPANESE SENTENCE FINAL PARTICLE *WA*?

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*WA* HAS BEEN CLASSIFIED AS AN EXCLAMATION and (along with *ne*, *na*, *yo*, *zo*, *ka* and *no*) as a sentence final particle (SFP) in traditional Japanese grammar. It conveys the speaker's attitude toward propositions, toward either him/herself or toward the addressee in the speech context. In general, *wa* is labeled as a gender-differentiated SFP. What makes it possible, then, to divide a single morpheme *wa* into male-usage and female-usage in the speech context, and moreover, what part of the nature of *wa* is associated with female gender? Here gender refers neither to grammatical gender, i.e. pronoun replacement or agreement, nor to the biological sex of the referent. Instead, it refers to a socio-pragmatic element, i.e. usage by men or women while they are speaking. In particular, if *wa* is a linguistic device for women's language, what motivates women to use it? The very definition of the feminine nature of the morpheme *wa* refers to the multifaceted nature of a complex entity, a mixture of prosodic components, semantic components and socio-pragmatic components. As long as the meaning of *wa* is intuitively discussed in terms of socio-pragmatic factors such as gender and is associated with the stereotype image of 'femininity', we will never arrive at the core meaning of *wa*.

The aim of this paper is to extract the core meaning from the cultural meaning of *wa*, i.e., the femininity of *wa* and to show that *wa* has its own invariant lexical meaning. In order to unravel the complexities of *wa* and to distinguish the lexical core meaning of *wa* from the cultural meaning of *wa*, we must deduce the semantic similarities and differences within the relationship between the different types of propositions and the SFP *wa* in an isolated environment in order to establish the core meaning which unifies the principle that a native speaker of the language can control her/his language behavior. The core meaning of *wa* can be explicated by adopting Wierzbicka's illocutionary semantic approach. Her method of reductive paraphrase provides the analytical means (Wierzbicka 1976, 1985, 1991).

The data, carefully collected from a wide range of sources, come from novels, weekly magazines, TV interview programs, and short live dialogues in TV advertisements, are intended to reflect real language use and also the androcentric cultural expectation of the language in the speech community.

1. PRELIMINARY DISCUSSION. SFPs convey the speaker's attitude toward the proposition and the addressee. Two concepts, Addressee-orientedness vs. Speaker-orientedness (Kodama 1989), are introduced as a basis for distinguishing between SFPs (*ne*,

*na*, *yo*, *ka*, *wa*). The SFPs can be divided into two categories: one is the Speaker-oriented SFP such as *na*, which is addressed to the speaker him/herself in monological self-talk situations; the other is the Addressee-oriented SFP such as *ne*, *yo*, or *ka*, which is addressed to the addressee in dialogic situations (Martin 1987:916, Jorden 1987). Their use is illustrated in (1)–(6).

- (1) *Tori ga ton-deiru* Ø.  
bird NOM fly-PROG SFP  
'The birds are flying.'
- (2) *Tori ga ton-deiru ka.*  
'The birds are flying [I ask you].'
- (3) *Tori ga ton-deiru ne.*  
'The birds are flying [you agree with me].'
- (4) *Tori ga ton-deiru yo.*  
'The birds are flying [I tell you].'
- (5) *Tori ga ton-deiru na.*  
'The birds are flying [you are invited to agree with me].'
- (6) *Tori ga ton-deiru wa.*  
'The birds are flying [I think].'

Both females and males could utter all of the sentences with SFPs, and the speaker expresses her/his attitude either toward the addressee or toward the speaker him/herself. The speaker simply describes her/his perception of the view that birds are flying across the sky in (1) by a declarative sentence that is an assertion that has illocutionary force in the speech context. Sentences (2) (3) and (4) are uttered toward the addressee, i.e. the Addressee-oriented SFPs which have illocutionary, and perlocutionary force which requires the addressee to do something regarding the utterance in Austin's (1962) sense. On the other hand, in (5) the speaker utters *na* toward her/himself rather than toward the addressee. In (6), *wa* in question is uttered neither toward the addressee nor toward the speaker.

The interrogative particle *ka* can form particle sequences with the Addressee-oriented SFPs (*ne*, *yo*) and with the Speaker-oriented SFP (*na*). However, the particle *wa* cannot occur after *ka* (*ka* + *wa*). That would produce a sentence meaning something like 'Are the birds flying [I think]', which makes little sense. The question contradicts the assertion communicated by *wa*. The particle sequences *ka* + *ne* and *ka* + *na* are possible, but not *ka* + *wa*. The speaker softens question by adding *ne* to *ka* (*ka* + *ne*), and the particle sequence (*ka* + *ne*) is explicitly an Addressee-oriented SFP in a dialogic speech context, while the particle sequence (*ka* + *na*) is used when talking to oneself, and therefore it is a Speaker-oriented SFP. The existence of the addressee is not necessary in (5), but it is obligatory in (2) (3) and (4). Sentence (5) can be uttered in self-talk as well as in a dialogic speech context, while (2), (3), and (4) are normally used in the dialogic speech context.



2. THE PROBLEM. Kitagawa's (1977) account is perhaps the first attempt to explicate the meanings of *wa* 'as a source [marker] of femininity'. He analyzes prosodic components and differentiates female-usage *wa* from male-usage *wa* based on its prosodic components. He claims that 'high sustained intonation' is 'a source of femininity' and supports Lakoff's hypothesis (1973) that this is a 'politeness strategy'. However, dealing with an intonation contour before clarifying the semantic components is problematic. An intonation contour easily changes the meaning of the proposition. For example, even a declarative statement in English with a rising final intonation becomes an interrogative sentence (Bolinger 1989, Ladefoged 1982). Kitagawa proposes that masculine *wa* means 'a strong sense of insistence', while feminine *wa* reduces the degree of insistence with gentle-question intonation and serves as an option-giving strategy. Gender, however, is a single socio-pragmatic factor among many factors relevant to the use of *wa*. Once we introduce other pragmatic factors such as age, as Kitagawa himself mentions, the femininity of *wa* may be contradicted or cancelled by the age-scale. If we consider only the pragmatic factors, we will fail to capture the meaning of *wa*.

McGloin (1986) argues against Kitagawa's analysis of *wa*. She points to the presence of *wa* in female-usage and the absence of *wa* in male-usage in the standard language and claims that the femininity of *wa* lies in the semantic/pragmatic domain rather than in prosodic components, and that *wa* is directed toward the addressee.

Both Kitagawa's and McGloin's analyses are in some ways problematic, although I basically agree with McGloin's analysis. First, neither has exhaustively investigated the relationship between *wa* and different types of propositions, i.e. in different context-free environments. Second, previous analyses have left out either prosodic components or inherent semantic/pragmatic components: Kitagawa leaves out inherent semantic components and McGloin ignores prosodic components in her analysis.

Hence, I argue that *wa* per se cannot be analyzed as a gender-differentiated particle without recourse to prosodic and socio-pragmatic factors and claim that the main function of *wa* is as an objectivizing mechanism that allows the speaker to shift her/his viewpoint toward the proposition from a proposition-internal position to a position external to the proposition (cf. subjectification in Langacker 1999).

4. GENDER-DIFFERENTIATED *WA*. McGloin argues that the femininity of *wa* is inherently a semantic/pragmatic property. Her evidence is the presence of *wa* in female-usage and the absence of *wa* in male-usage in combination with other particles. But there is some male-usage of *wa* such as in (7). McGloin presents these examples as crucial evidence for its feminine flavor (see Jorden 1987:(1)231, for 'one example of truly feminine *wa*'). The semantic/pragmatic property of *wa*, according to McGloin, is 'to assert a proposition with emotional emphasis', and *wa* is present in female usage to express a woman's feelings toward the addressee. But it is absent from male usage, since men do not express their feelings toward the addressee. McGloin interprets feminine *wa* as a 'positive politeness' strategy in terms of Brown and Levinson (1987), since feminine *wa* serves to establish rapport with the addressee.

There is a contradiction, however, in her analysis, since all her examples require either rising/sustained intonation or other Addressee-oriented SFPs like *ne* (7)a and *yo* (7)b which directly involve the addressee in the speech event. It is not clear, therefore, whether the speaker establishes rapport with the addressee with *wa* per se, or with an intonation contour (rising-sustained intonation) or with other Addressee-oriented SFPs (*yo*, *ne*). Her study was not designed to allow isolation of *wa* from these other variables (rising/high sustained intonation or Addressee-oriented SFPs which directly involve the addressee in the speech context). Since there can be up to three SFPs in a single sentence, (7)c and (8)c, her analysis fails to clarify whether *wa* per se has the function of establishing rapport with addressee.

- (7) a. *Oishii wa Ø ne.*  
       tasty SFP SFP SFP  
       'It's good, isn't it?'  
      b. *Oishii wa yo Ø.*  
       'It's good, I tell you.'  
      c. *Oishii wa yo ne.*  
       'It's good, isn't it?' (Cited McGloin, 1986:11).

Conversely, there are counter examples to McGloin's examples, uttered by males, in (8). According to Martin (1987:920), even in standard Japanese, males use *wa*, and both males and females use it in a major dominant dialect in Kansai district (cf. Maeda 1977).

- (8) a. *Umai wa Ø na. (wa ne = wa na)*  
       tasty SFP SFP SFP  
       'It's good, isn't it?'  
      b. *Umai wa i Ø. (wa yo = wa i)*  
       SFP SFP SFP  
       'It's good, I tell you.'  
      c. *Umai wa i na. (wa yo ne = wa i na)*  
       SFP SFP SFP  
       'It's good, isn't it?' (Spoken in the Kansai district in Japan)

Now (8)a–c, spoken by males, are counter examples to (7)a–c. The specification of the speaker's gender is determined by the lexical item *umai*, which is a rustic expression for *oishii* 'delicious', that is a 'beautification' (Harada 1976:504–05, Shibamoto 1985:134). Therefore, the selection of the word *umai* implies that the speaker is male. The function of *na* corresponds to that of *ne*, and *i* to *yo*. (8)a–c clearly indicate that the speaker establishes solidarity with addressee by saying *na* (= *ne*) or *i* (= *yo*) in addition to *wa*. *Na* and *ne* seek agreement from the addressee; the difference between *na* and *ne* is that *na* can be used in purely monological self-talk, i.e. it is a Speaker-oriented SFP, while *ne* is only used in dialogic situations, i.e. it is an Addressee-oriented SFP. By

saying *na*, the speaker identifies psychologically with the addressee. This means that it is unnecessary for the speaker to consider face-saving or face losing among the participants or to convey her/his attitude toward the addressee straightforwardly, since the speaker has already established solidarity between them. This is a case of positive politeness strategy (Levinson 1983).

Thus, (8)a–c do not indicate that *wa* per se serves to establish solidarity/rapport between the speaker and the addressee. Therefore, although McGloin claims *wa* as a 'positive politeness' strategy, this process is not clearly defined in her analysis. The distribution of each SFP in (7)a–c and (8)a–c is exactly the same and their functions are also the same. Hence in (7) and (8) the same semantic property of *wa* appears, and in both cases the prosodic components and socio-pragmatic components of *wa* are irrelevant factors at a semantic level.

Now consider the examples in (9).

- (9) a. *Bakani chikara ga ariyagaru wa.*  
       awfully power NOM be[deprecated] SFP  
       'It is awfully strong.'  
       b. *Bakani chikara ga ariyagaru na.*  
       awfully power NOM be[deprecated] SFP  
       'It is awfully strong.'

In (9), someone was asked to take a dog for a walk. He did not expect the dog to pull him so strongly. He is talking to himself about how surprised he is by the strength of the dog. The difference between (9)a and (9)b is that (9)b is purely Speaker-oriented because of the use of *na*, while (9)a is oriented toward the proposition rather than the speaker himself. By saying *wa*, the speaker highlights the proposition against the pre-existing conditions—his presumption about the size or strength of the dog, etc.—(cf. Morishige 1977) and experiences the proposition with deictic simultaneity i.e. here and now (Lyons 1977:685).

Consider the example (10), in which *wa* can be uttered by both male and female.

- (10) a. *Atta wa.*  
       exist.PAST.PLA SFP  
       b. *Atta Ø.*  
       'I've found it.'

In (10), the speaker has been looking for the book, and has been thinking of the book consciously or subconsciously for a while. By uttering *wa*, the speaker traced back to the situation in which s/he had lost it. By stepping back, the speaker (= the viewer) is able to see the event in relation to some broader context in (10)a, while s/he does not in (10)b. (10)b captures the moment state when the speaker found it. The addressee's presence is not necessary, since (10)a and (10)b can be uttered in a monologue. It is

irrelevant whether there is direct interaction between the speaker and the addressee, but there is an interaction between the speaker and a pre-existing situation.

Consider (11):

- (11) a. *Aa gan ga tondeiku wa.*  
           ah wild geese NOM flying[+go] across SFP  
           ‘Ah, wild geese are flying across the sky.’  
       b. *Aa gan ga tondeiku Ø.*  
           ah wild geese NOM flying[+go] across  
           ‘Ah, wild geese are flying across the sky.’

The initial utterance *aa* indicates the speaker’s sudden perception of the sight. The final *wa* in (11)a highlights the proposition against the pre-existing background, such as a seasonal association with the view, and indicates the speaker’s mental activity from an encounter between the onset of her/his perception and the thought which it has invoked. The verb form *-t[d]e iku* indicates that the temporal path of the flock of the wild geese across the sky. Thus, by saying *wa* the speaker’s attitude toward the proposition is added.

The speaker objectivizes the proposition and views the proposition from an externalized viewpoint by saying *wa*, as if s/he takes off her/his jacket and examines it as an object, i.e. the speaker can control her/his attitude toward the proposition as if s/he handles her/his jacket, which s/he has taken off with her/his both hands. The speaker can use it for communicative purposes without imposing a requirement on the addressee to take action or allowing her/himself to remain non-committal toward the addressee.

I propose that the semantic property of *wa* is that the speaker highlights the proposition and objectivizes it by externalizing her/his viewpoint, as if s/he leaves the stage and watches it from the audience’s viewpoint. Accordingly, the processing time to link with a pre-existing background is also involved. On the whole, *wa* is essentially a proposition-oriented SFP, and a potential gender-differentiated meaning is irrelevant at the semantic level. This paper argues that *wa* alone cannot serve as a feminine marker without recourse to prosodic and paralinguistic information. It is crucial to examine each of these components separately (Brown & Levinson 1987:30). In the next section, we consider the distribution of *wa*.

5. THE OCCURRENCE OF *WA* IN DIFFERENT TYPES OF SENTENCES. According to Nitta (1989), sentences which mark the modality of speech act, are divided into four types: imperative, desiderative, declarative, and interrogative. *Wa* can occur only with declarative and desiderative sentences, while *ne*, *na*, and *yo*, are not so limited. Consider (12):

(12) **Imperative + SFPs:**

- a. *Ike.*  
    ‘Go!’

- b. \**Ike ne*.
- c. *Ike na*.
- d. *Ike yo*.
- e. \**Ike wa*.

In (12)b, the imperative form per se forces the addressee to go. The use of *ne* is contradictory here, since the speaker cannot seek agreement with the addressee in a situation where s/he can make the addressee to take the action in her/his command, which is given only when the speaker can disregard the addressee's face. On the other hand, in (12)c with *na*, a Speaker-oriented SFP, the speaker psychologically identifies with the addressee. *Na* reduces the degree of imperative force of predicates, and as a result, the sequence *ike na* is less forceful than *ike*. *Yo* is an Addressee-oriented SFP and emphasizes the speaker's insistence. However, in the sequence imperative + *yo*, *yo* is used to soften the command for the addressee in (12)d. The speaker may know that the addressee does not want to obey the order and therefore, by adding *yo* to *ike*, shows her/his concern for the addressee's feelings and lets the addressee know it. Hence the sequence imperative + *yo* serves as a suggestion rather than an imperative in (12)d.

Now consider (13):

(13) **Interrogative + SFPs:**

- a. *Ano hito wa Nihonjin desu ka.*  
that person TOP Japanese COP.POL Q  
'Is s/he Japanese?'
- b. *Ano hito wa Nihonjin desu ka ne.*  
'You think that s/he is Japanese?'
- c. *Ano hito wa Nihonjin desu ka na.*  
'I wonder if s/he is Japanese?'
- d. \**Ano hito wa Nihonjin desu ka wa.*

Imperative and interrogative sentences have perlocutionary force as well as illocutionary force and directly involve the interaction between the speaker and the addressee. Therefore they can co-occur with the Addressee-oriented SFPs, but not with *wa* in (12)d and (13)d. On the other hand, declarative sentences do not essentially require the existence of an Addressee and can be used in a self-talk. Hence, *wa* can co-occur with declarative and desiderative predicates. The following examples take *wa* at the end of the sentence as well as *ne*, *na* and *yo*.

(14) **Declarative + SFPs**

- a. *Yamada san desu yo.*  
Yamada Ms./Mr. COP.POL  
'I tell you that s/he is Ms./Mr. Yamada.'
- b. *Yamada san desu wa.*  
'I think that s/he is Ms./Mr. Yamada.'

(15) **Desiderative+wa**

- a. *Kohii ga nomi-tai.*  
coffee NOM drink-DES  
'I want to drink coffee.'
- b. *Kohii ga nomi-tai wa.*  
'I want to drink coffee.'
- c. *Kohii ga nomi-tai ne/na/yo.*  
'I want to drink coffee, will you/I wish/I am telling you.'

In (15)a and (15)b, the speaker expresses her/his desire to drink coffee. Both could be uttered in either a self-talk or in dialogue. By saying *wa* in (15)b, the speaker is following the mental path leading to her/his desire. Here processing time of the speaker's mental activity is realized in *wa*. On the contrary, in (15)c, *ne* and *yo* are Addressee-oriented SFPs, although *na* is marginal in terms of the degree of Addressee-orientedness.

Now consider (16) and (17).

- (16) a. *Ano e wa yokunai.*  
that painting TOP good.NEG.PLA  
'That painting is not good.'
- b. *Ano e wa yokunai wa.*  
'That painting is not good.'
- (17) a. *Kodomo ga terebi o mi-teiru.*  
children NOM television ACC watch-PROG.PLA  
'Children are watching the television.'
- b. *Kodomo ga terebi o mi-teiru wa*  
'Children are watching the television.'

(16)a indicates the speaker's judgment about the painting, while (17)a is simply describing the scene without emotional feeling. In (15), (16), and (17) without *wa*, the speaker's viewpoint is internalized; by adding *wa*, the speaker externalizes her/his viewpoint from the proposition, as if s/he takes off her/his jacket and examines it from a distance which is entirely under the speaker's control. The speaker can examine it either closely or from afar. This is a place where prosodic components interact with the utterance (Bolinger 1989). Thus, *wa* in the above examples (15)–(17) serves the same function in each case. The speaker detaches her/himself from the proposition, i.e. objectivizes the proposition. The speaker looks back to confirm to her/himself what s/he is thinking in her/his mind by uttering *wa*.

6. NON-OCCURRENCE OF *WA* WITH MATRIX MODALITY. Declarative sentences with modality-tentative *-oo*, *-daroo*, or the negative form of tentative *-mai*, cannot co-occur with *wa*. These sentences require that the subject always be the first person singular, and have no tense contrast. Let us examine them individually.

*Wa* cannot occur with the volitional affix *-oo*, although *ne* and *yo* which are the Addressee-oriented SFP can occur with *-oo*. Specifically, the matrix modality (the inclusion of the speaker's = the subject's volition in the proposition) of *-oo* is incompatible with *wa*. Consider the following examples.

- (18) a. *Kotoshi koso ganbar-oo.*  
           this year indeed work hard-VOL.PLA  
           'I'll really work hard this year.'
- b. \**Kotoshi koso ganbar-oo wa.*  
           this year indeed work hard-VOL.PLA  
           'I'll really work hard this year.'
- c. *Kotoshi koso ganbaru wa.*  
           this year indeed work hard.PLA  
           'I'll really work hard this year.'

Here, *-oo* subjectivizes the proposition. In other words, *-oo* internalizes the speaker's mental attitude within the proposition. Therefore, (18)a can only take the speaker, i.e., the first person singular, as a subject, and indicates that the speaker's volition is internalized within the proposition. Therefore, with *-oo*, the speaker cannot detach him/herself from the proposition. That is, the speaker cannot objectivize the proposition without changing the matrix modality. In (18)c, the matrix modality (the speaker's = the subject's volition) is eliminated from the proposition, therefore *wa* can be added. This involves the process of objectivizing the proposition by the speaker. Apparently, between (18)a and (18)c there is a shift from a subjectively modalized proposition to an objectively modalized one.

Compare the following tentative sentences.

- (19) a. *Ame ga furu-daroo.*  
           rain NOM rain-TEN.PLA  
           'It will rain.'
- b. \**Ame ga furu-daroo wa.*  
           rain NOM rain-TEN.PLA
- c. *Ame ga furu-deshoo.*  
           rain NOM rain-TEN.POL  
           'It will rain.'
- d. \**Ame ga furu-deshoo wa.*  
           rain NOM rain-TEN.POL

In (19), the tentative forms (*daroo/deshoo*) cannot take *wa*, regardless of the speech level, while (20b) can. Compare (19)b with (20)b.

- (20) a. *Ame ga furu-kamaoshirenai*  
 rain NOM rain-is not known[probability]  
 'There's no telling whether it may rain or not.'
- b. *Ame ga furu-kamaoshirenai wa.*  
 rain NOM rain-is not known [probability]  
 'There's no telling whether it may rain or not.'
- c. *Furukamoshirenai ame no tame-ni kasa o katta.*  
 rain-[probability] rain for umbrella ACC bought.PLA  
 'I have bought an umbrella, since it may rain.'
- (21) a. *Ano hito wa koros-are-nakatta kamoshirenakatta.*  
 that person TOP kill-PASS-NEG.PAST [probability].PAST  
 'That person may not have been killed, [if s/he did not go out that night.]'
- b. *Korosarenakatta kamoshirenakatta ano hito...*  
 'That person who may not have been killed...'

*Kamoshirenai* anticipates a tentative situation can be used in an embedded sentence (20)c, and can have a past tense, while *-daroo* can neither be embedded nor have a past tense. This indicates that the speaker's attitude is internalized within the proposition ending in *-daroo*. However, this is not the case with *-kamoshirenai*, and accordingly, the speaker can attach her/his attitude to the proposition with *wa*.

There is another example that demonstrates the relationship between the objectivizing mechanism and the modality. *Mai* is the negative form of the tentative and it is rarely used in spoken Japanese nowadays.

Consider (22), in which the speaker's volition is involved.

- (22) a. *Nidoto konna koto wa suru-mai.*  
 again like this things TOP do-AUX.NEG.PLA  
 'I will not do that again.'
- b. \**Nidoto konna koto wa suru-mai wa.*  
 'I will not do that again.'
- c. *Nidoto konna koto wa shi-nai wa.*  
 again like this things TOP do-NEG  
 'I will not do that again.'

In (22) the speaker expresses her/his determination by using *-mai*. This is a matrix modality in which the speaker's attitude is internalized within the proposition; therefore, *wa* cannot be attached after the matrix modality. The matrix modalities *-mai* and *-daroo* cannot occur in an embedded sentence, and are not compatible with the objectivizing mechanism of *wa*. Therefore, (22)b is not acceptable. This means the speaker cannot be detached from the proposition, unless s/he replaces the verb *suru* (affirmative) with *shi-nai* (negative), and externalizes her/his attitude from the proposition, and then attaches *wa* such as in (22)c.



7. THE MEANING OF *WA*. *Wa* highlights proposition against the pre-existing conditions. By saying *wa*, the speaker objectivizes her/his mental activity toward the proposition. The speaker recognizes the existence of the addressee and knows her/his utterance will reach the addressee in the speech context, but *wa* does not involve the addressee and does not impose any speaker's expectations on the addressee. *Wa* has an illocutionary action but not a perlocutionary action. Therefore the addressee has great freedom of response because other possible interpretations of the utterance are available (cf. Leech 1983).

From the above discussion, we may conclude that *wa* has the following semantic and socio-pragmatic components.

- (a) **I want to cause myself to be sure of what I am thinking in my mind.**
- (b) **You may understand that I am sure of what I am saying.**
- (c) **I say this because you do not have to do or say something if you do not want to.**
- (d) **I say this in this way because of these things.**

'I want to cause myself to be sure' indicates that the speaker externalizes her/his vantage point from the proposition and objectivizes the proposition (Langacker 1987:128–32). 'What I am thinking in my mind' expresses the idea that the speaker is engaged in inner consultation, which was highlighted against a pre-existing situation by saying *wa*. (b) expresses the speaker's commitment toward the proposition, which reaches the addressee in the speech context. (b) and (c) indicate the pseudo-Speaker-oriented aspect of meaning of *wa*. (c) spells out the attitude by which the speaker keeps a psychological distance from the addressee through indirect options.

The prosodic component (rising or high sustained intonation) for the female usage of *wa* may be added as follows:

**I want you to understand what I am thinking in my mind.**

'I want you to understand' indicates that the speaker strongly expects the addressee to participate in the speech context. So this prosodic component cancels 'you may understand' in the semantic/pragmatic component (b) above, but the component (c) is still valid and reduces the degree of the prosodic component of 'I want you to understand'. This intonation contour is used by females rather than males (Pike 1964). Female intonation patterns are 'marked', while male pattern are treated as neutral or 'unmarked' (McConnell-Ginet 1983:78). Therefore, we must consider the prosodic components, too. Cultural imposition may be revealed by examining each facet of language use (Brown & Gilman 1960, Hill 1986, Suzuki 1975). Hence, *wa* per se does not have a gender-differentiated meaning but a semantic/pragmatic nature, which allows it to bear a wide range of different types of intonation contour.

8. CONCLUSION. In this paper I have argued that *wa* per se cannot be analyzed as a gender-differentiated particle. *Wa* has been examined in different types of propositions and the analysis reveals that the main function of *wa* is as an objectivizing mechanism that allows the speaker to shift her/his vantage point vis-a-vis the proposition from a proposition-internal to a proposition external position. This process is realized as a highly skilful linguistic device for communicative purposes, namely to save the face of participants in the speech context via a negative politeness.

*Wa* may be considered within a broader investigation that includes thematic and contrastive *wa*, which would require a study of the historical aspects of *wa*. This remains for future research. In reality, however, *wa* is a part of the living language and as the social and economic status of women changes, their self-understanding will affect the selection of SFPs used. We suspect that *wa* will not be treated as a gender-differentiated word very much longer.

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## THE ECONOMIST'S CAMBODIA: WHOSE VOICE? WHOSE REALITY?

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THIS PAPER IS CONCERNED with cultural semiotics and the clash of value systems evidenced in news reporting by *The Economist* magazine in its coverage of events in Cambodia in recent times. The central question asked is whose reality is being reported? That is, to what extent is it a Cambodian reality and to what extent is it a Western construction of a Cambodian reality? Within the paradigm of Critical Discourse Analysis, the paper considers the issue of point of view, with a specific focus on projected voice, and argues that there is ideological consistency in *The Economist's* reporting which functions, in effect, as an ideological filter.

1. BACKGROUND. Why examine *The Economist's* reporting? *The Economist* is widely acknowledged to be a respected and influential publication read by the elites (and aspiring elites) of government, industry, commerce and academia in the English-speaking world and beyond. This select readership is in a position to make decisions that can and do affect the lives of people throughout the world. If this readership can be aligned to *The Economist's* point of view, then clearly this publication is in a powerful position to influence world affairs. My previous research, (Moore 2002) is, to my knowledge, the only published work that has dealt directly with the issue of ideological motivation in *The Economist* from a linguistic perspective. It examines the obituary column as a corpus, and shows how even in an area that might be expected to be relatively free of ideology (i.e. *The Economist's* system of values and beliefs), a strong ideological imprint is still detectable. The present research shifts focus from a peripheral feature of the magazine to consider *The Economist's* regular reporting of one particular country over an extended period of time.

Why focus exclusively on Cambodia, a small, non-Western country, located far from *The Economist's* London base? Although it is now of little consequence in terms of world affairs, in the late 20th century Cambodia was at the center of the ideological struggle between the West and Communism. Western interference in the region contributed significantly to the near total destruction of this 1000-year old society, and now the West is taking a leading role in attempting to reshape Cambodia in its own image. Given the clear differences in cultures, traditions and values, post-1991 Cambodia makes an interesting case study of a clash of civilizations (Huntington 1997).

Western civilization's relatively recent rise to dominance in the world order has been seen by *The Economist* as proof of the superiority of its own brand of rational thinking (Edwards 1993); it is no coincidence that the magazine's official history is titled *The Pursuit of Reason*. However, *The Economist's* application of reason to

understanding and explaining Cambodia to its readers needs to be examined critically because, as Whorf observed, 'We do not know that civilization is synonymous with rationality' (1956:81).

2. POINT OF VIEW. There are many different linguistic resources that enable a writer to present a point of view. Simpson (1993) cites the work of Boris Uspensky as adapted by Roger Fowler to distinguish spatial, temporal, psychological and ideological planes. He also demonstrates how the systems of modality and transitivity contribute to presenting a point of view. Short (1994) suggests seven linguistic indicators of point of view in narratives, including given and new information, socially deictic expressions, internal representations of thoughts, and value-laden expressions. For the purposes of this paper, it is desirable to consider point of view from a slightly different perspective. We can assume that *The Economist* is providing its own point of view, in various ways, but to what extent does it also provide the points of view of others? How much of a non-Western voice gets reported in Asian stories? How much and what sort of Cambodian voice gets reported in Cambodian stories? The answers to these questions will affect the reality constructed and conveyed to readers.

3. DATA AND METHODOLOGY. The data selected for this study consist of 18 lead (but non-editorial) articles published in *The Economist's* Asia section between 1991 and 1998 (see Appendix 1). These lead articles are part of a larger corpus of 129 articles published by *The Economist* from late 1991 to mid-2002 but, by virtue of their placement and length (averaging approximately 960 words each), are deemed to represent the publication's core reports on Cambodia since the Paris Peace Accords were signed in 1991, ending the country's international isolation.

The 18 articles are examined in the Critical Discourse Analysis tradition of peeling away layers of linguistic edifice which conceal hidden ideological settings (Fairclough 1995a, 1995b). The theoretical model adapted for this investigation is that of Thompson (1996). In this model, the text is analysed for averral (i.e. the reporter's voice) and attribution (i.e. a voice other than the reporter's). My study here is concerned with attributed voice. Thompson distinguishes four dimensions of choice in relation to attributed voice: (1) voice: the voice presented as the source of the report; (2) message: the type of voice presented (similar to the continuum of narrator control presented in Leech and Short 1981); (3) signal: the structural (i.e. grammatical) realisation of reporting; and (4) attitude: the reporter's attitude (a) towards the truth of the reported message, or (b) towards the speaker rather than the message. This paper will deal primarily with the first two dimensions in this model since they provide sufficient evidence to make the case that an ideological filter operates when *The Economist* reports on Cambodia.

The issue of a culture clash is dealt with in methodological terms by focusing on a specific, recurrent participant in Cambodian current affairs, the Cambodian prime minister, Hun Sen. He presents an interesting challenge to *The Economist*, given his peasant background and lack of formal education in combination with an authoritarian leadership style and wily ways, all consistent with Cambodian culture, values and tradi-

tions. His voice projection in *The Economist* can be tracked over time as he consolidated power during the seven-year period under review. It can also be measured against that of three other major political figures in Cambodian public life: King Sihanouk; Prince Ranariddh and Sam Rainsy. Evidence supporting the dominance of just four key Cambodians in *The Economist's* reporting from 1991 to 1998 is found in the frequencies of reference to them in the 18 articles, as shown in Appendix 1. Hun Sen appears most frequently (14 articles); King Sihanouk fades over time (10 articles, but only 3 after 1993); Prince Ranariddh and Sam Rainsy both appear almost exclusively in the later articles (9 and 7 articles respectively, all but one after 1995). No other Cambodians appeared as frequently as these four. A brief sketch of Hun Sen's rivals is now provided in order to enable a better evaluation of the comparisons that follow.

King Sihanouk, who was reinstated as monarch after the 1993 election, is widely viewed as the father of the nation and has played a central role on the Cambodian scene since first ascending to the throne in 1941. He is revered by many rural Cambodians as a god-king, but his power has waned since the 1993 election. Prince Ranariddh is a French-educated son of King Sihanouk and leader of the royalist party, the second strongest after Hun Sen's party. He was co-prime minister with Hun Sen following the 1993 election but was ousted from power in the 1997 coup led by Hun Sen. He is widely viewed as an ineffectual leader, more interested in the trappings of power than its effective exercise. Sam Rainsy is an articulate, French-educated, Western-style politician who served as finance minister in the government formed after the 1993 elections. He was dismissed from that post following his attempts to crack down on government corruption and has since become an outspoken leader of the opposition and darling of the West. Of the four Cambodians, his beliefs align most closely with *The Economist's* creed of democracy, rule of law and open markets.

4. ANALYSIS AND DISCUSSION. The averred or authorial voice of *The Economist* is the unmarked option in its reporting. This voice relies on the authority of the journal itself for its own authority. The attributed voices, on the other hand, are a marked option which allows non-authorial voices to be heard. There are several reasons for the inclusion of attributed voices in media reporting: they are a sign of more objective and balanced journalism drawing on multiple sources of information and views; they allow other authoritative voices to be heard; and they create rhetorical interest for the reader. The kinds of attributed voices included in *The Economist's* reports are either those of the participants in a story or those of expert observers. The means of articulating attributed voices can be analysed along a cline of narrator control (Leech and Short 1981), ranging from no control (i.e. direct quotation) to complete control (i.e. narrator control of speech act). The degree of mediation plays a significant role in how an attributed voice is positioned for ideological purposes.

All projections of speech, thought and writing in the 18 articles were analysed, and a summary is presented in **Table 1** (overleaf). The voices have been arranged in the table to reflect a shift away from the West towards a different cultural environment. In a sense, the UN can be seen to articulate between the Western and Asian camps. The

| Origin of projecting voice | No. | %     | Speech | Thought | Writing |
|----------------------------|-----|-------|--------|---------|---------|
| The West                   | 22  | 9.0   | 26     | 7       | 3       |
| United Nations             | 40  | 16.3  | 22     | 41      | 18      |
| Asia (excluding Cambodia)  | 23  | 9.4   | 17     | 15      | 1       |
| Cambodia                   | 106 | 43.3  | 139    | 97      | 4       |
| Ambiguous                  | 54  | 22.0  | 40     | 69      | —       |
| Total                      | 245 | 100.0 | 244    | 229     | 26      |

**Table 1.** Summary of attributed voices: origin, instances and type of projection.

low percentage of Western voices is not entirely surprising: many of the UN voices are in effect doing the West’s bidding. Moreover, my wider research has revealed that *The Economist’s* own Western voice always dominates its reporting on Cambodia through an evaluative framework within which the rest of the article is embedded (Moore 2003). What is more surprising, however, is that less than half of the attributed voices are unambiguously Cambodian. If *The Economist* were genuinely interested in providing a Cambodian perspective, one would expect it to rely more on Cambodian voices; the fact that it does not suggests, perhaps, a lack of linguistic affinity, cultural arrogance or even an ideological motivation. Another surprising result seen in **Table 1** is the high percentage of ambiguous voices, comprising almost one in four. If the cultural affinities of these different voices cannot be pinned down then they tend to merge with *The Economist’s* averred voice. The analysis summarised in **Table 1** deals with the projection of speech, thought and writing of individuals and groups. As none of the writing projections involved the four key Cambodians, and since their involvement in groups conflates their voices with those of others, this paper will now focus exclusively on the projections of their speech and thought as individuals.

4.1. PROJECTED SPEECH. In using quotes, a writer allows a participant to, in effect, speak for him/herself. As one proceeds across the continuum of narrator control voices are increasingly mediated by the writer and the faithfulness of the reported message is increasingly at risk. **Table 2** unpacks the speech projection identified in Appendix 1 by highlighting the critical distinction between direct quotes and other reported speech. (See Appendix 2 for details of grammatical signals in speech projection and Appendix 3 for a listing of the direct quotes.) The first important feature to note in **Table 2** is the shift, over time, in Hun Sen’s projected speech pattern. Bearing in mind that he was Cambodia’s prime minister throughout the period under review, his speech voice ranges from (1) absent; to (2) just two instances of direct quotes; to (3) only reported speech. Moreover, when Hun Sen is given direct quotes, they are all short: ‘a good sport’, ‘a good job’, and ‘mistake’; and all are located medially within sentences of reported speech, with none representing a complete clause. King Sihanouk and Prince Ranariddh each have just one direct quote (aligned with *The Economist’s* views): King Sihanouk’s is critical of Hun Sen’s rule: ‘...mourning he says, “a divided, broken, humiliated, desperate nation, whose future is beyond darkness”’;



| Text | Hun Sen | King Sihanouk | Prince Ranariddh | Sam Rainsy |
|------|---------|---------------|------------------|------------|
| 2    |         | RS            |                  |            |
| 6    |         | RS            |                  |            |
| 7    |         |               |                  |            |
| 8    | DQ      | RS            |                  |            |
| 9    |         | RS            |                  |            |
| 10   |         |               | RS               | DQ         |
| 11   |         |               |                  | DQ + RS    |
| 12   | DQ + RS |               |                  | DQ + RS    |
| 13   | RS      |               | RS               |            |
| 14   | RS      |               | RS               |            |
| 15   |         |               |                  |            |
| 16   | RS      | DQ            |                  |            |
| 17   | RS      |               | DQ + RS          | DQ         |
| 18   | RS      |               | RS               | DQ + RS    |

**Table 2.** Occurrence of direct quotes (DQ) and other reported speech (RS).

while Prince Ranariddh's promotes the issue of democracy: 'It's more important for the election to be successful'.

The second notable feature in **Table 2** is the high concentration of direct quotes in Sam Rainsy's speech, present in every article where he is given speech projection. A closer examination reveals the special treatment given to his speech. First, his projections are complete as stand alone sentences, even when introduced by reporting clauses. Second, they are significant in length (45 words; 12 words; 8 words + 7 words; 5 words + 18 words; and 4 words). Third, on three of five occasions, the quote is in initial position. This allows a further increment of direct appeal to the reader, not available if the quote is set up by a preceding reporting clause. Fourth, the content of Sam Rainsy's messages is sometimes of a universal rather than local nature. Thus at times his voice seems to be not so much his own idiosyncratic one but rather a more prototypical Western activist one. For example, in text 11: "No human being", he says, "should have to choose between bread and freedom". This quote is particularly revealing in its use of the word *bread* (a Western metaphor) rather than *rice* (the staple food in Cambodia). To sum up, the patterns of direct quotes clearly show that Hun Sen's voice is highly restricted and mediated whereas Sam Rainsy has a privileged position in terms of being allowed to speak at length and directly to the reader.

Concerning patterns of reported speech apart from direct quotes, there is insufficient space here to provide much detail. However, my wider research shows that it ranges across the continuum of narrator control in the cases of Hun Sen, King Sihanouk and Prince Ranariddh, but not for Sam Rainsy, whose projections are most often in direct quotes (Moore 2003). Patterns in the semantic qualities of reported speech also reveal interesting contrasts. Excluding neutral grammatical signals (i.e. *say, ask*), and those in common among the four Cambodians (i.e. *promise, suggest, persuade*,

| Text | Hun Sen    | King Sihanouk | Prince Ranariddh | Sam Rainsy       |
|------|------------|---------------|------------------|------------------|
| 2    | D(1)       |               |                  |                  |
| 6    |            | D(1)          |                  |                  |
| 8    |            | C(1)          |                  |                  |
| 11   | C(1); D(1) |               | C(1); D(1)       | C(1); D(1); E(2) |
| 12   |            |               |                  | P(2)             |
| 13   | D(4)       |               | D(3); E(1)       | E(3)             |
| 14   | C(1)       |               |                  |                  |
| 17   | D(4)       |               | D(2)             |                  |
| 18   |            |               | D(1)             | D(1)             |

**Table 3.** Summary of type and frequency of projected thought of four Cambodians (P = Perceptive; C = Cognitive; D = Desiderative; and E = Emotive).

announce, offer), the remaining signals indicate that Hun Sen and Sam Rainsy are again positioned as polar opposites, while King Sihanouk and Prince Ranariddh have very few distinctive contributions (see Appendix 2). Hun Sen’s distinctive signals suggest a voice of both defensive and offensive stances, bearing a degree of emotional content: *claims, justifies, insists, likes to emphasise, likes to imply, felt able to boast, threatened, and ordered*. By contrast, Sam Rainsy’s signals suggest the voice of initiative and reason: *is calling for, argues* (twice), and *reasons*.

4.2. PROJECTED THOUGHT. Attributed voice can also be articulated through projection of thought. Halliday has shown how wordings (quotes) and meanings (ideas) differ in terms of their status as linguistic phenomena: wordings are a lexico-grammatical representation of a non-linguistic representation, whereas meanings are a semantic representation of ideas (Halliday 1994:252). Thus speech and thought projections should be seen as distinct in their contributions to construing reality; the former realised through verbal processes, the latter through mental processes. *The Economist* often chooses to attribute thoughts or feelings to participants in its reporting. However, whereas the source of speech projection can often be verified through various public sources, thoughts are much harder to verify unless one has direct access to the thinker. The fact of the matter is that *The Economist* can only know what someone else is thinking if it is told; otherwise it is simply speculating when it purports to project someone’s thoughts. Indeed there is only one instance in the data where a source of projected thought is actually identified (King Sihanouk).

**Table 3** summarises the instances of projected thought of the four Cambodians. (The actual grammatical signals can be found in Appendix 4.) The thoughts are categorised according to Matthiessen’s work (1995:271–72) on the lexical spread of verbalised mental processes, and can be aligned in a continuum as follows:

[Behavioral-like]    perceptive → cognitive → desiderative → emotive [Mental-like]  
                                 (e.g. see)            (e.g. think)    (e.g. want)            (e.g. fear)

Again it is instructive to compare the treatment of Hun Sen with that of the other Cambodians. Hun Sen's thought projections are overwhelmingly of the desiderative type, indicating his wants and desires. Prince Ranariddh's thoughts are presented in a similar way although, as indicated in Appendix 4, the majority of his thought projections are actually shared with either Hun Sen or Sam Rainsy. (This helps to reinforce the impression that Prince Ranariddh cannot think for himself.) By contrast, Sam Rainsy's most common category of thought projection is of the emotive type. Unlike the other Cambodians, he alone has projections of the perceptive type and hence projects across all four zones. These selections for projecting Sam Rainsy's voice help to dimensionalise him more than the other Cambodians: not only is Sam Rainsy's content in alignment with *The Economist's* views, but his persona is presented as the most human and balanced of the four Cambodians.

4.3. CAMBODIAN POINT OF VIEW. The Cambodian census taken in 1998 revealed that 80% of Cambodians lived in rural areas and worked as subsistence farmers (*General Population Census of Cambodia 1998*). Yet in *The Economist's* 18 major articles on Cambodia in the 1990s, not once is a Cambodian peasant given a voice. Nor is there any female voice present among all the Cambodian voices that are projected. What might these voices have to say about democracy and the rule of law? A national survey conducted in 2001 revealed that fully two-thirds of respondents could not describe any characteristics of a democratic country, and over half held a paternalistic view of government, consistent with their cultural heritage (*Democracy in Cambodia 2001*). To these people—the overwhelming majority of the population—Sam Rainsy's ideas are not only foreign but potentially dangerous: they involve taking significant risks in discarding the familiar and real in favour of the unfamiliar and abstract. Hun Sen, by contrast, faithfully represents their cultural heritage and expectations, no matter how he may be perceived by foreigners.

5. CONCLUSION. English is the language resource through which *The Economist* creates and patterns its own discourse. As this paper has shown, the linguistic patterns it uses to project speech and thought in its reporting on Cambodia do not vary randomly but rather are an index of the magazine's ideological creed, one alien to Cambodia's culture, traditions and values.

And every language is a vast pattern-system, different from others, in which are culturally ordained the forms and categories by which the personality not only communicates, but also analyses nature, notices or neglects types of relationship and phenomena, channels his reasoning, and builds the house of his consciousness. (Whorf 1956:252)

The consciousness of Cambodia that one can gain from relying on *The Economist's* reporting can only be a serious distortion of the real Cambodia, however conceived.

| No    | Date     | Hun Sen |        |           | King S |        |         | Prince R |        |           | Sam Rainsy |        |         |
|-------|----------|---------|--------|-----------|--------|--------|---------|----------|--------|-----------|------------|--------|---------|
|       |          | Ref.    | Speech | Thought   | Ref.   | Speech | Thought | Ref.     | Speech | Thought   | Ref.       | Speech | Thought |
| 1     | 26.10.91 | Yes     |        |           | Yes    |        |         |          |        |           |            |        |         |
| 2     | 25.01.92 | Yes     |        | 1         | Yes    | 1      |         |          |        |           |            |        |         |
| 3     | 20.06.92 |         |        |           |        |        |         |          |        |           |            |        |         |
| 4     | 18.07.92 | Yes     |        |           | Yes    |        |         |          |        |           |            |        |         |
| 5     | 15.08.92 |         |        |           |        |        |         |          |        |           |            |        |         |
| 6     | 05.09.92 |         |        |           | Yes    | 1      | 1       |          |        |           |            |        |         |
| 7     | 21.11.92 | Yes     |        |           | Yes    |        |         |          |        |           |            |        |         |
| 8     | 29.05.93 | Yes     | 1      |           | Yes    | 4      | 1       |          |        |           |            |        |         |
| 9     | 05.06.93 | Yes     |        |           | Yes    | 4      |         | Yes      |        |           |            |        |         |
| 10    | 17.06.95 |         |        |           |        |        |         | Yes      | 1      |           | Yes        | 1      |         |
| 11    | 27.01.96 | Yes     |        | ½ x 2     |        |        |         | Yes      |        | ½ x 2     | Yes        | 2      | 4       |
| 12    | 17.08.96 | Yes     | 2      |           |        |        |         |          |        |           | Yes        | 4      | 2       |
| 13    | 01.02.97 | Yes     | 3      | 1 + ½ x 3 | Yes    |        |         | Yes      | 2      | 1 + ½ x 3 | Yes        |        | 3       |
| 14    | 12.07.97 | Yes     | 4      | 1         |        |        |         | Yes      | 1      |           | Yes        |        |         |
| 15    | 19.07.97 | Yes     |        |           |        |        |         | Yes      |        |           |            |        |         |
| 16    | 01.11.97 | Yes     | 5      |           | Yes    | 1      |         | Yes      |        |           |            |        |         |
| 17    | 04.04.98 | Yes     | 1      | 4         |        |        |         | Yes      | 5      | 2         | Yes        | 1      |         |
| 18    | 01.08.98 | Yes     | 4      |           | Yes    |        |         | Yes      | ½      | ½         | Yes        | 1 + ½  | ½       |
| Total |          |         | 20     | 9½        |        | 11     | 2       |          | 9½     | 6         |            | 9½     | 9½      |

**Appendix 1.** Summary of 18 lead articles and instances of reference, speech and thought projection. (½ indicates a shared projection).

| Hun                                                                                                                                                                                                                                                                        | Sen                                                                                                                                                                   | King Sihanouk                                                                                                                                                                                                       | Prince Ranariddh                                                                                                                                                                                    | Sam Rainsy                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [8:13] has pledged<br>[12:8] has thanked<br>[12:8] said<br>[13:2] promised<br>[13:5] suggested that<br>[13:7] has said that<br>[14:4] likes to emphasise<br>that<br>[14:4] is working hard to<br>persuade<br>[14:5] claims<br>[14:5] likes to imply<br>[16:2] insists that | [16:3] threatened<br>[16:6] says<br>[16:7] felt able to boast that<br>[16:8] justifies<br>[17:7] says<br>[18:3] ordered<br>[18:7] said<br>[18:7] said<br>[18:7] asked | [2:1] prodded along by<br>[6:11] said<br>[8:10] has offered<br>[8:10] has suggested that<br>[8:11] persuaded<br>[9:10] can persuade<br>[9:11] announced that<br>[9:11] said<br>[9:11] had mentioned*<br>[16:1] says | [10:12] said<br>[13:5] announced<br>[13:5] offered<br>[14:3] trying to whistle up<br>support<br>[17:6] asked<br>[17:6] saying<br>[17:6] promised<br>[17:6] told<br>[17:6] said<br>[18:6] announced* | [10:8] says<br>[11:5] says<br>[11:9] suggests<br>[12:8] argues that<br>[12:9] is calling for<br>[12:11] concedes<br>[12:11] argues<br>[17:11] reasons<br>[18:6] said<br>[18:6] announced* |

**Appendix 2.** *Speech projection signals.* (\* indicates a shared projection. [8:13] = text 8, paragraph 13).

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hun Sen          | [8:13] Mr Hun Sen has pledged to be “a good sport”, no matter what the results of the election.<br>[12:8] Now Hun Sen, the more powerful of Cambodia's two joint prime ministers (and once a Khmer Rouge himself), has thanked Ieng Sary for a “good job” that may save thousands of lives, and said past “mistakes” should be forgotten—though he does seem to be drawing the line at offering Ieng Sary a cabinet post.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| King Sihanouk    | [16:1] The head of state, King Sihanouk, has gone off to China in a sulk, mourning he says, “a divided, broken, humiliated, desperate nation, whose future is beyond darkness”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Prince Ranariddh | [17:6] “It's more important for the election to be successful,” he said.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Sam Rainsy       | [10:8] Sam Rainsy, a former finance minister who is now a vocal critic of the government, says: “We are no longer fighting a war over ideologies. This is a war over who owns the wood. It is evident that many military operations have been conducted to get control over timber or to prevent the other side getting its hands on it first.”<br>[11:5] “No human being”, he says, “should be asked to choose between bread and freedom.”<br>[12:8] But even Sam Rainsy, a leading opposition politician, argues that—“the future is more important than the past” and that “compromise is necessary to avoid further bloodshed.”<br>[17:11] “This is the most important,” reasons Sam Rainsy, an opposition politician. “The vast majority of the people of this country don't need to be convinced to vote for change.”<br>[18:6] “They stole the vote,” he said. |

**Appendix 3.** *Direct quotes in projected speech.* ([8:13] = text 8, paragraph 13).

| Hun Sen                             | King Sihanouk                                | Prince Ranariddh                             | Sam Rainsy                       |
|-------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------|
| [2:7] in an attempt to discredit    | [6:11] favoured this idea                    | [11:11] felt able to be “too busy”*          | [11:7] fears                     |
| [11:11] felt able to be “too busy”* | [8:12] seemed to be retreating from the idea | [11:12] seem to prefer*                      | [11:9] is pinning his hopes on   |
| [11:12] seem to prefer*             |                                              | [13:5] would certainly have been taken aback | [11:9] takes comfort from        |
| [13:6] appear to oppose*            |                                              | [13:6] appear to oppose*                     | [11:9] the belief that           |
| [13:7] will not accept              |                                              | [13:9] cannot agree about*                   | [12:9] sees as a “turning-point” |
| [13:9] cannot agree about*          |                                              | [13:9] have agreed on*                       | [12:9] sees                      |
| [13:9] have agreed on*              |                                              | [17:5] wants victory                         | [13:10] is confident (that)      |
| [14:3] is gambling that             |                                              | [17:9] wants a royal pardon                  | [13:10] less sanguine (that)     |
| [17:2] had no interest in           |                                              | [18:6] would reject**                        | [13:11] in worrying              |
| [17:3] preferred to fix             |                                              |                                              | [18:6] would reject**            |
| [17:3] wants the credit             |                                              |                                              |                                  |
| [17:5] aims to win                  |                                              |                                              |                                  |
| [17:3] preferred to fix             |                                              |                                              |                                  |
| [17:3] wants the credit             |                                              |                                              |                                  |
| [17:5] aims to win                  |                                              |                                              |                                  |

**Appendix 4.** Thought projection signals. (\* = shared between Hun Sen and Prince Ranariddh; \*\* = shared between Prince Ranariddh and Sam Rainsy. [2:7] = text 2, paragraph 7).

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## THE WOMEN OF DOUSDERM: A WORLD VIEW IN SONG AND POETRY

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*to the memory of Ruth Brend*

THIS IS A STORY ABOUT WOMEN, strong women who have a firm sense of themselves as both intellectual and feminine beings. This is also a paper about language and how it is used to construe experience through meaning<sup>1</sup>, how language and social interaction, and culture and gender intertwine to create the worlds we live in.

In more formal terms: language is a semiotic system through which we construct our experience of the world, both external and internal. More precisely, language is a system of systems: the ideational system through which we categorize and sequence by means of lexis and grammar; the interpersonal system through which we create human interaction; and the textual system which provides the resources for contextualizing discourse. *Any* text, be it oral or written or signed, construes experience by an intricate dance involving these three systems simultaneously. This construction of our world of events and objects is a social phenomenon, a dialogic interaction among people. Though fluid, the ways in which individual communities stylize their linguistic encounters is highly structured, functionally motivated, and a set part of the customs and mores of that community.

Perhaps the most common, and the most mundane, of these linguistic rituals is casual conversation. Eggs and Slade state that casual conversation is first and foremost concerned with the creation of social reality, in which we negotiate 'such important dimensions of our social identity as gender, generational location, sexuality, social class membership, ethnicity, and subcultural and group affiliations' (1997:6). For this reason, the study of seemingly insignificant linguistic rituals can be enormously insightful.

But different communities develop different social linguistic rituals, of which only one is casual conversation. In the female communities of the Anti Atlas region of Morocco, more formalized call-response interaction takes on a prominence that rivals, if not exceeds, that of casual conversation. Women communicate with each other as they go about their daily tasks through set-pattern call-response, through song cycles, and through stylized chants that serve the functions Malinowski grouped under the rubric phatic communion: maintaining social contact, establishing and reinforcing relationships of power and interaction, and passing on local gossip. These social linguistic exchanges can also serve the pragmatic functions of advancing the activity at hand. Though these communicative acts take various forms—from literal call-response chants to recitation of proverbs or passages from the Qur'an—the most

common form is the *aHwash* or song cycles particular to the Berbers of Morocco's southern mountain region<sup>2</sup>.

*AHwash* serve, on a daily basis, as group entertainment, expression of immediate emotions and interrelationships, and celebration of important (or even mundane) occurrences and achievements. They also function, in a more general sense, to pass down the values and history of the community and maintain group identity. Thus *aHwash*, is, in a sense, both the casual conversation of the Berber women and their literature. It is also a, if not the, prime means through which these women construe experience.

1. BACKGROUND. The remote mountains of southern Morocco are dotted with Berber villages populated almost entirely by women. These women are essentially non-literate, their lives circumscribed by orality. Yet they barter, shop, practice a rich spiritual life—and compose and perform poetry, song cycles, and stories in a cultural heritage rich in history and moral lessons. In a world in which oral, indigenous languages are disappearing at an alarming rate, the various dialects of Berber within Morocco seem to be holding their own. Somewhere between 33% and 44% of Moroccans have Berber as their native language<sup>3</sup>. This tenacity of Berber against all odds is ironically linked to the high rate of illiteracy among rural women in general and Berber women in particular (as high as 87% for rural women). For various cultural, historical, and economic reasons, the situation in Morocco today encourages the migration of males out of Berber villages and into cities—or abroad—to find work<sup>4</sup>. This leaves whole Berber villages mainly populated by women who maintain their traditional way of life, including their language.

2. RESEARCH. For three years, from 1999–2001, I spent my summers living among the women of one of these Berber villages, the village of Dousderm. During that time, I collected on audiocassette tape over five hours of *aHwash* performance. I have divided these performances into three categories: 1) casual evening self-entertainment; 2) *soirée*, or formal party, performance; and 3) celebratory, honoring a particular person (a bride or a recent *haja* 'a woman who has made the pilgrimage to Mecca'). Though the context of each of these differs, the basic form of the *aHwash* remains the same. Though group performance, each village has its leader. She is the one who signals the beginning of the performance by taking command of the large two-sided drum beaten with a stick; other women play small finger drums. The women divide themselves into callers and responders. The callers sing out a line and the rest repeat it. Sometimes the same phrase is repeated over and over; sometimes the phrases cycle. Always there is a chorus, and the invocation of God. The various phrases within the cycle seem to be improvised on the spot, yet they too come from a long tradition, recalling the generations of women who came before them doing precisely the same ritual in precisely this same spot of mountain crest. As the singing and drumming heats up, women get up to dance, usually in pairs or threes, their steps patterned, their bodies swaying, their hands clapping in a syncopated rhythm. Old women sing

and clap along, smiling at remembered verses, and emitting spontaneous ululations from time to time.

3. *AHWASH*. *AHwash* take their content from the Berber poetic tradition with themes of generosity, hospitality, religion, and romantic love. The *aHwash* itself and each individual song is, however, like casual conversation, particularized to the moment, place, and individuals present. Songs bring in local figures, aspects of the local culture, and the background and interests of those in attendance. One of my first experiences with this practice came during an informal picnic with some of the young women of Dousderm during my first stay in the village. Beating a rhythm on empty water canisters, the women began a song cycle that was a tribute to one's genealogy. The verses went something like this: 'Oh, lovely Latifa, daughter of Ahmed'. The refrain cycled through the various women present until it came to me; I was asked the name of my father. This simple song was an obvious communication to me, a newcomer, of the lineage of the various women and a polite and ritualized way of finding out my lineage. In other settings, one might ask, 'Who is your father? Where do you come from?' This song also conveys much about the culture in that women are defined by their father's family: the most important information about a person is one's patriarchal lineage.

4. ANALYSIS OF SONG 5<sup>5</sup>. The following analysis is of Song 5 on the first tape I made in 1999, the 'Scorpion' *aHwash*. Typical of later *aHwash* I heard, the Scorpion *aHwash* began with three short song cycles, after which the songs increased in length and complexity, as well as spontaneity. The *aHwash* ended, as every gathering of the women ends, with a collective oral prayer, asking pardon from God and blessing for his prophet Mohamed. This prayer is chanted while the women stand in a close circle facing in, their right hands touching in the center.

(1) (beginning line)

*wa sidi ssalaam u 'alaykum / iga Swaab y ils*  
 and Sir peace unto you this politeness of tongue  
 'Peace be with you, oh Sir. This politeness is a way of our language.'

While Song 5 may seem a song of love found, it is essentially a paean to themselves, the beautiful gracious women of Dousderm. The opening line is the set phrase *salam alaykum* 'peace be with you', but this traditional greeting is immediately situated in terms of 'our language', literally 'our tongue', and by extension 'our culture'. Though the words *salam alaykum* are Arabic, the phrase is a common part of the language of every Muslim culture. In this case, the women have taken the phrase for their own; 'tongue' refers to their own language, Tachelhit (the Berber dialect spoken in that region). The message conveyed in this opening line is: we are a polite and hospitable culture.

- (2) (basic line of narrative)

*aseggas ankka ggummiHki / ifulki ghaSSaD ufiHki*  
 year marriage-contract not find a way/ beautiful today you-find-I  
 'I have spent a year without a wedding contract. Today is beautiful because I  
 have found you.'

The narrative is a common one in the Berber culture, being derived from the Berber poetic tradition: romantic love. This romantic notion of marriage and love is in direct contrast to the real lives of most of these women, who were married by arrangement to men they first met on their wedding night, men often much older than themselves. As is traditional in Moroccan culture in general, there is little romantic about either the wedding night or the marriage to follow, and such notions as courting are rare at best. In fact, Fatima, the leader in Dousderm, a woman in her 50s, is a fourth wife and continues to live in the same household with her husband and a co-wife. And little has changed: during my last summer in the village, there was a wedding between a local son (a man whom I had never seen until the night of the wedding) and his bride from a distant village. The festivities were a purely female affair—from my point of view—with the groom appearing for a brief, and private, first meeting alone with his bride, after which he disappeared again and we women continued our song and dance celebrating this new woman of Dousderm. Despite the reality of arranged marriages, these women dream of 'finding true love' and the myth of finding romantic love is a prominent theme in their literature.

- (3) (basic line of narrative)

*sidi mulay lHaj amughriH / ad yyifk lhawa ghu saysi*  
 sir Mulay Haj I-consulted / FUT. that love here find  
 'I consulted Mulay Haj so that I might find love.'

Marriage is the single goal toward which these Berber women strive; only when they marry will they become a part of the community of women that is the center of their lives. In Song 5, the plight of a young woman not yet married is expressed with reference to the common tradition of Berber women of seeking intervention and *baraka* 'blessings' from patron saints. Women of the area often visit the shrine-tombs of local ancestors-turned-saints and make offerings and say prayers for the saint's help in personal matters. The most famous local saint in the area of Dousderm is Mulay Haj, buried in Taфраout; he is often visited by poets and singers who seek inspiration and ask for blessing in their art. The mention of him here indicates his local fame.

- (4) (refrain line)

*ih awa titbirin*  
 oh soul pigeons  
 'Oh, my soul, what pigeons [beautiful women].'

Interspersed with the narrative is the line of praise of the beautiful women of Dousderm: 'oh, what pigeons,' a common metaphor for young, voluptuous maidens. The pervasiveness of this metaphor was evidenced in the snickering and double-entendre comments that were a part of everyday life in the village: the women seldom mentioned the word *titbirin* or heard their coo without a knowing smirk or bawdy reference.

(5) (refrain line)

*atay ay atay / kiyyi aygan ljid*  
 tea oh tea you(masc.) who generous  
 'Oh, the tea, the tea. You (masc.) are one who is generous.'

Another line that cycles through this song is *atay atay*. Tea, and the serving of tea, is the universal Berber symbol of hospitality. Even the lowliest worker or beggar woman who entered the compound where I lived was immediately served tea.

(6) (ending line)

*a sidi lHassan aglid*  
 Sir Hassan king  
 'Sidi Hassan the king.'

Finally, the name of Hassan II, the king at the time of this recording, is invoked. The king is next to God, a figure of reverence. His name is often invoked and his health and prosperity wished. In fact, Hassan II died only a few weeks after this *aHwash* was taped. He had been fighting cancer for a long time and the whole country was aware that he was dying. In subsequent summers in Dousderm, I did not hear the same invocation for Morocco's new king, perhaps because he is young and strong and not in any apparent need of the well-wishes of the populous. That this kind of invocation appeared in 1999 is one indication of the fluidity of the individual song cycles and the material included in them, as well as the alacrity with which current events are integrated into the set pattern of traditional songs.

On an interpersonal level, *aHwash* is collective performance, but not static. Even the most set song advances as a relationship between performers and between performer and audience, situated within the context of situation. I have no doubt that my own presence affected what songs they sang, who initiated verses, what verses were initiated, and how the song unfolded. The Scorpion *aHwash* was, in fact, not only the first *aHwash* I recorded, but also my first experience with the casual evening *aHwash* of the women of Dousderm. The women were not aware that I was recording<sup>6</sup>, but they were very attuned to my presence in their midst—or rather at the periphery of their group. As a communicative event similar in many crucial ways to casual conversation, *aHwash* songs, though composed of fixed moves are fluid in their unraveling. The spontaneity of verses is apparent to even the casual observer with few language skills. Those present wait for the creation of the next line with anticipation; in *this* sense the *aHwash* song is similar to conversation. There is, however, little in the way

of turn-taking. As the song warms up—and the *aHwash* gets into full swing—participants are more likely to shout out lines from the sidelines and interject bits and pieces of information, overriding the callers' move priority. But for the most part, the leader and her few fellow callers keep control of the flow.

The nature of Song 5 as an interpersonal exchange is complex. Though lines are sometimes created by individuals, most are sung in collective voice. The narrative mimics a conversation between two people: we assume the speaker is a young woman and the addressee is a young man, but there is nothing grammatically that would indicate that. In line 1, the speaker is 'I' non-gendered, in a language highly-gendered, and the addressee is unspecified 'you.' Though *sidi* is a male honorific, in informal conversation, the term is used loosely and sometimes addressed to women. Lines 2 and 3 are the basic narrative. Line 4 *ih awa titbirin* 'oh, what pigeons,' which is repeated throughout the song as a refrain, shifts point of view to one in which a male is apparently commenting on the beautiful women of the village. The voice of Line 5 is very perplexing in that the 'you' here, *kiyyi*, is emphatically male and explicitly stated. Thus, in this song sung by women, the voice is either generic or male; in a language that is highly gendered and within a culture where feminine forms predominate, there are no female forms in this song.

I can only speculate on the reason. One possible explanation is that interaction between men and women in this culture is extremely limited. While women may dream of a romantic encounter with a man, there is nothing in their linguistic resources that would allow them to create such a conversational encounter. But this is also poetry, and Berber poetry, in particular, is open to gender fluidity. It may also be the case that as a poetic ideal, male qualities—being the ideal qualities—are the ones that are emphasized; that is, the idealized woman becomes male<sup>7</sup>.

As a text, the *aHwash* song has a set form, of which this song is typical. It begins with a set phrase of welcome, introducing the addressee as well as setting the scene. All interactions in this culture begin in this way. Thus, the participants are grounded in the cultural context of situation. In addition, the *wa* is a discourse marker of interaction initiation or turn-taking: what follows is going to be a conversation or casual communication. Like a conversation, the song takes a circuitous route, circling back on itself, with verses loosely tied with refrains, but the 'story' or theme of any particular song does not develop in a narrative-like sequence of beginning-middle-end. There is much repetition. A song seems to end when the participants get tired or run out things to say; the leader shifts to a different rhythm or ends with a definitive whack of the big drum—or some distraction (like a scorpion) interrupts the flow and the song abruptly ends.

Songs tend to fade in and fade out rather than have definitive beginnings and endings. Some songs simply segue into the next with no apparent transition; others will end with drum beats building to a crescendo and a flourish of ululations from the crowd.

5. CONCLUSION. Texts are semiotic entities that both reflect and form the culture of those who produce them. As such, we learn much about the women of Dousderm

through this apparently mundane art form. But the *aHwash* also serves internally to define the lives of these women. As the women of Dousderm move toward literacy (in Arabic, not Berber) they inevitably lose much of their unique female perspective on the world—and their world becomes, literally, a different place.

- <sup>1</sup> This phrase is shamelessly borrowed from the title of the recent tome by Michael Halliday and Christian Matthiessen, *Construing Experience through Meaning*.
- <sup>2</sup> Use of the term 'Berber' is not without controversy. 'Berber' is a Western label but one used consistently in the literature in English and French, by both Moroccans and non-Moroccans, to refer to both the people and the language in general. Work done in Arabic tends to use the cover term 'Amazighi' to refer to the people and 'Tamazight' to refer to the language in general, though this also has political overtones, Tamazight being the dialect spoken by the largest group of native speakers. The dialect of Dousderm is Tachelhit and the people are the Chelha. [*t*...-*t* is the fem.]
- <sup>3</sup> According to UNESCO estimates, adult illiteracy in 1995 was 56.3% (males 43.4%; females 69.0%). In 1992, only 24% of girls (33% of boys) of relevant age group were enrolled in Secondary schools (*Middle East and North Africa 1997*).
- <sup>4</sup> Brett and Fentress stress the social, as opposed to the economic, reasons for the recent mass exodus of men from Berber villages in the Anti Atlas Mountains, where tribal warfare was long a way of life. Thus, while males have traditionally been mobile and 'free (or forced) to adapt to the hegemonic culture', women stayed at home and guarded the traditional life style. Brett and Fentress state that recent emigration may serve as a 'safety valve for the village communities, keeping the population growth in check and, particularly, keeping down the number of resident males of an age to make war' (1996:264).
- <sup>5</sup> I would like to thank Brahim Boussouab, Professor of Arabic at Al Akhawayn University of Ifrane, Morocco, for his transcription of the Scorpion *aHwash* and his help in translating and explicating the songs. Without the generous giving of his time and his native knowledge, this work would not have been possible.
- <sup>6</sup> Habiba, my host, did know that I was recording. Later, as I became a more accepted part of the village and my language skills improved, I became more adept at judging the acceptable parameters for both taping and photographing the women; indeed, I became something of an 'official' recorder, especially for parties. Toward the end of my stay, I played back this tape for the women; they were openly delighted. Subsequent taping was done openly, often at the explicit urging of the women.
- <sup>7</sup> I would like to thank Fatima Sadiqi for her insights into this aspect of Song 5, as well as her comments on the paper in general.

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# FROM DISCOURSE TO GRAMMAR: GRAMMATICALIZATION AND LEXICALIZATION OF RHETORICAL QUESTIONS IN KOREAN<sup>1</sup>

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IN GRAMMATICALIZATION STUDIES discourse has been widely recognized as one of the most important domains where grammaticalization is triggered (Hopper & Traugott 2003[1993]), since discourse is the locus of active meaning negotiation, in the course of which an array of potential meanings associated with a form is made available for possible conventionalization of context-induced reinterpretations (Heine et al. 1991, *inter alia*).

In discourse, various strategies like rhetorical questions are used by interlocutors to achieve communicative aims effectively. In stylistics, a rhetorical question is a question which does not expect an answer, since it really asserts something which is known to the addressee and presumably cannot be denied (Wales 2001). For our purposes, however, we will extend the definition to include all questions asked without the intent of soliciting answers, regardless of whether the addressee has the knowledge on the matter. Therefore, rhetorical questions as defined here essentially include all strategic uses of questions that are different from conventional ones in that they do not seek information or require answers. Since questions can be formed with as few constituents as single interrogative pronouns, our discussion also includes certain developments involving interrogative pronouns only.

Rhetorical questions are used to enhance the impact of an assertion by engaging the addressee in the interaction by demanding a response to an apparent question, and at the same time revoking the demand in one way or another, including signals that the question does not require an answer. These questions are particularly susceptible to grammaticalization, since they are subjected to meaning negotiation by virtue of their frequent appearance in discourse, and their grammaticalization into certain grammatical markers has indeed been attested. These important elements of discourse, however, have not received due attention in grammaticalization studies to date, with Herring (1991) for Tamil being a notable exception. This study is intended to fill the gap by presenting the grammaticalization of discourse markers and lexicalization of indefinite adverbs from rhetorical questions in Korean.

1. GRAMMATICALIZATION OF DISCOURSE MARKERS. Rhetorical questions are grammaticalized into diverse markers of grammatical functions in Korean. The most salient function of the grammaticalized rhetorical questions is one as discourse markers, the development of which, despite some controversy, is regarded as an instance of grammaticalization (Traugott 1995, Brinton 1996, Hopper & Traugott 2003[1993]). Making

use of discourse markers, the speaker presents the question either as a full-fledged question, thus fully engaging the addressee, or as an embedded form, thus relieving the addressee from answering. In Korean syntax, the complementizer that marks an embedded clause follows the clause. Moreover, embedded interrogative sentences/clauses are identical in linear order to non-embedded full questions, so embedded questions still exert strong engaging force on the addressee.

The functions of these discourse markers are diverse and include discourse initiation, topic presentation, pause-filling, mitigation, emphasis, and attention-attraction.

1.1. DISCOURSE INITIATORS. Discourse initiators developed from rhetorical questions are used by interlocutors to initiate a discourse, and the two most frequently used forms are as in (1)<sup>2</sup>.

- (1) a. *iss-ci?*  
       exist-Q  
       ‘Look!’ (Lit. Does (it) exist?)  
    b. *iss-c-anh-a?*  
       exist-NF-Neg-Q  
       ‘Look!’ (Lit. Doesn’t (it) exist?)

The two forms in (1) mean ‘Does/Doesn’t (it) exist?’ literally, but semantically they are vacuous. In discourse, however, they have the important function of initiating a discourse. The speaker initiates a discourse by engaging the addressee to answer if something does or does not exist. (Note that this something is not present in the text, even as a pronominal form.) This is in line with the crosslinguistic observation that verbs of existence can develop into topic presenters (Heine et al. 1993), presumably because these verbs presuppose the existence of the entity being presented as a topic. The development of discourse initiator function in these cases makes use of such an existence verb and a question to maximize the engaging effect of the addressee.

The engaging effect of these discourse initiators is infallible. The addressee is bound to respond to these initiators, normally by a *ung/yey* ‘yes’, a listenership signal. From a superficially semantic perspective, this interaction of ‘Exist?–Yes’ as the opening of a discourse may sound ludicrous, considering that the interlocutors have not yet established a topic. The lexical semantics of the existence verb is completely bleached in the course of its development into a discourse initiator.

1.2. TOPIC PRESENTERS. Some rhetorical questions are also grammaticalized into topic presenters as in (2)–(4).

- (2) a. *kuke-y X-nya-myen*  
       it-NoM X-Q-if (where X is who/what/when/where/how/why)  
       ‘The thing is...’ (Lit. If (you) ask who/what... it is)

- b. *kuke-y encey-nyamyen caknyen imamttay-ya*  
 it-Nom when-Top:Presenter last.year around:this:time-Dec  
 'Speaking of the time, it was around this time last year.' (Lit. If (you) ask  
 'When is it?')...
- (3) a. *X-nya-myen*  
 X-Q-if (where X is a proposition)  
 'If we are to discuss X' (Lit. If (one) asks if X)
- b. *kusalam-i ttokttokha-nyamyen kukes-to ani-ketun*  
 he-Nom be:smart-Top:Presenter it-even not-End  
 'Speaking of his intelligence, he is not smart.' (Lit. If (you) ask 'Is he  
 smart?')...
- (4) a. *way X-iss-c-anh-a?*  
 why X-exist-NF-Neg-Q (where X is an NP)  
 'You know X, right?' (Lit. Why, doesn't X exist?)
- b. *way Kimsensayng-isscahna?*  
 why Mr:Kim-Top:Presenter  
 'You know Mr. Kim, right?' (Lit. Why, doesn't Mr. Kim exist?)

These topic presenters differ from discourse initiators in that the former, as the name suggests, tend to appear at the beginning of a segment of a discourse with a single topic, whereas the latter tend to occur at the beginning of an interaction between the interlocutors. As is evident in (2)–(4), these topic presenters are templates rather than single items in that the slot indicated as X allows for insertion of a range of items from the same paradigm. For this reason, these cases do not fit the traditional notion of grammaticalization, which normally addresses development into highly unitized forms like words or morphemes rather than constructions.

The crosslinguistic relation between topic and conditionals has long been recognized (Haiman 1978, Koo 1989). The development of the topic presenters in (2) and (3) makes use of a conditional (*-myen*) as well as a question (*-nya*). The rhetorical strategy here is that the speaker presents an apparently full-fledged question and then immediately cancels the requirement of an answer to the question by the following conditional marker signaling that the question is an embedded one. The topic presenter in (4) resorts to a different strategy: they are full-fledged question in form, often identical even in suprasegmental features such as intonation. The engaging effect of these topic presenters is such that (2) is typically followed by the speaker's assertion, presumably inarguable due to the speaker's assumed authority over the matter; and (3) by a strong negative assertion, i.e. the proposition X is normally negated.

1.3. PAUSE-FILLERS. There are pause-fillers developed from rhetorical questions, as in (5):

- (5) a. *mwe-la-l-kka?*  
 what-Comp-Fut-Q  
 'like/well...' (Lit. what should (I) say?)

- b. *ku mwe-nya?*  
 that what-Q  
 'like/well...' (Lit. what is it?)
- c. *X-la-te-la?*  
 X-Comp-Retros-Q (where X is who/what/when/where/how/why)  
 'what/who...is it?' (Lit. what/who... did they say it was?)

The pause-fillers are full-fledged questions in form. Nevertheless, (5)c is rarely used as an independent question, and its illocutionary force is cancelled by a typical non-question intonation. The Korean language has a fully grammaticalized honorification and politeness systems that deeply permeate all parts of the grammar. Any violation of honorification or politeness renders an utterance not merely pragmatically unacceptable but grammatically incorrect. The examples in (5), especially (5)a and (5)b, by virtue of being complete sentences in form, are subject to full morphological trap-pings, including the use of sentence-final honorification marker or morphological replacement according to honorification requirements. Interestingly enough, even when a [+honorific] or [+polite] marking is warranted by an addressee who is a social superior, these forms may not be so marked. This is a clear indication that these forms are no longer questions *per se*. Equally interestingly, some of these forms may be marked [+polite], cf. the politeness marker *-yo* for (5)a. However, even when (5)a is so marked, it is not intended to be a question, in that neither does the speaker expect an answer nor does the addressee feel obliged to provide one. This indicates that the forms in (5) have moved into the domain of the discourse markers, but the forms are not (yet) fossilized enough to be opaque to morpho-syntactic operations.

1.4. MITIGATORS. Another category of discourse markers developed from rhetorical questions is mitigators, the main function of which is to tone down an assertion being presented. Those listed in (6) are some of these mitigators.

- (6) a. *mwe-la-l-kka*  
 what-Comp-Fut-Q  
 'let's say' (Lit. what should (I) say)
- b. *eti / mwe*  
 where / what  
 'well'

The mitigator (6)a is identical in form with (5)a and shares certain features with it, in that both of them are epenthetically used and that they indicate some type of hesitation on the part of the speaker. For these reasons they are obviously related and sometimes indistinguishable. One major difference is that the form in the mitigator function is motivated by the speaker's intention to reduce the assertive force, whereas the form in the pause-filler function is necessitated by the speaker's difficulty in linearizing linguistic materials.

The mitigators in (6)b, *eti* ‘where’ and *mwe* ‘what’, are identical to interrogative pronouns and pronoun-only interrogative sentences (which are not only possible but also very common in Korean). However, these forms as mitigators are entirely deviant semantically from actual pronouns, as shown in (7).

- (7) a. *eti na-to com mek-ca*  
       where I-too a little eat-Hort  
       ‘May I get to eat a little bit, too?’ (Lit. Where, let me eat a little.)  
   b. *kuke-n pyello an coh-untey mwe*  
       it-Top particularly not good-End what  
       ‘It doesn’t seem to be so good (to me).’ (Lit. It is not particularly good, what.)

As is shown in (7), *eti* ‘where’ and *mwe* ‘what’ do not refer to a space or an entity, respectively, as they would if they were pronouns. Instead, taking the entire proposition as their scope, they tone down the assertiveness of the proposition.

1.5. ATTENTION-ATTRACTORS. Some rhetorical questions have been grammaticalized into attention-attractors. The main function of these discourse markers is to attract the attention of the addressee. Some of them work as in (8).

- (8) a. *etteh-supnikka?*  
       how-Q  
       ‘What do you think?’ (Lit. How is (it)?)  
   b. *X-i-n-ka?*  
       X-be-Pres-Q (where X is an NP)  
       ‘Is (it) X?’

The examples above look exactly like ordinary sentences with literal meanings, i.e. with no special grammaticalized function. In fact, they can be used with literal meanings, too. In addition, (8)a and (8)b have certain variations. For example, (8)a has other counterparts, depending on variations along the formality and politeness axes: *ettay?* [-Polite, -Formal], *ettayyo?* [+Polite, -Formal], *ettenka?* [-Polite, +Formal], in addition to *ettehsupnika?* [+Polite, +Formal] presented above. Likewise, the form in (8)b has variants depending on the tense and aspect axes: *X-ilkka?* [Future], *X-iesna?* [Past], *X-itenka?* [Present Retrospective], *X-iesstenka?* [Past Retrospective], etc. Thus it resembles regularly inflected sentences. However, these expressions as discourse markers depart from regular sentences by the fact that they can be used discourse-initially when the addressee does not have an established topic. The extreme suddenness associated with these forms without contextual cues of what is being referred to in such literal questions as ‘How is (it)?’ or ‘Is (it) X?’ produces an engaging effect on the addressee, often to the level of embarrassment. It is often observed that the addressee, caught by surprise, asks what the speaker meant. To avoid this undesired conversational twist, since the question is rhetorical, the speaker preempts

the speaker-turn, usually by proceeding without a pause or with a pause not long enough for a response. The following examples illustrate the point.

- (9) a. *Kim-paksanim, etteh-supnikka? ipen hoytam-i cal*  
       Kim-doctor how-Q this:time meeting-Nom well  
       *toy-kyess-supnikka?*  
       become-Fut-Q  
       'Dr. Kim, what do you think? Will this (summit) meeting go well?'  
   b. *cinan tal-i-n-ka? nay-ka hongkhong ka-ssest-ci.*  
       past month-be-Pres-Q I-Nom Hong Kong go-Plup-End  
       'Was it last month? I've been to Hong Kong.'

As is shown above, these questions are given to an addressee who does not have prior knowledge of what the questions are about. From the addressee's literal perspective these questions are defective. According to Korean syntax, if the question sentences are meant to be bona fide questions, they should follow, not precede, the second sentence with certain additional morpho-syntactic devices for subordination. These rhetorical questions are built on apparently stark rudeness, but they are often employed without such adverse effect, a fact indicative of their being routinized.

The fact that these forms still resemble regular sentences in form and that their forms are still transparent to morpho-syntactic operations such as the addition or substitution of grammatical morphemes suggests that the grammaticalization process is at an incipient stage with a low degree of fossilization.

1.6. EMPHATICALS. Another discourse function acquired by certain rhetorical questions is marking emphasis. There are two question words, *way* 'why' and *eti* 'where', used in this function, as shown in (10).

- (10) a. A: [Didn't you have much trouble?]  
       B: *way? kosayng cengmal manh-ass-ci.*  
           why? trouble really be:much-Pst-End  
           'Absolutely! We had lots of trouble.' (Lit. Why? We had...)  
   b. A: [He is truly a genius.]  
       B: *eti? cenhye an ttokttokha-y.*  
           where? never Neg be:smart-End  
           'Absolutely not! He is not smart at all.' (Lit. Where? He is not...)

As seen in the discourse segments, the question words are used singly, either as an emphatic substitute for 'yes' in (10)a and for 'no' in (10)b. Even though these uses are not normally recalled by Korean speakers as a usage associated with such forms, they often surface on casual speech, a fact indicative of their early stage of grammaticalization into discourse markers.

2. INDEFINITE ADVERBS AND INDEFINITE PRONOUNS. In addition to grammaticalization into discourse markers, rhetorical questions display lexicalization, a process whereby a non-lexical form becomes a fully referential lexical item (Hopper & Traugott 2003[1993]:49). The lexicalization process is exemplified by the development of indefinite adverbs from interrogative pronouns and interrogative constructions. In a similar way interrogative pronouns and interrogative constructions gave rise to indefinite pronouns.

2.1. INDEFINITE ADVERBS. The interrogative pronouns denoting ‘when’, ‘where’, and ‘how’ have developed into indefinite adverbs, as illustrated in (11).

- (11) a. *encey* ‘when’ → ‘some time’  
       b. *eti* ‘where’ → ‘somewhere’  
       c. *ettehkey* ‘how’ → ‘somehow’  
       d. *ettehkey ettehkey* ‘how how’ → ‘somehow’

Likewise, certain interrogative constructions are developed into indefinite adverbs:

- (12) a. *encey-(i)-n-ka* → ‘some time’ (Lit. when is it?)  
       when-(be)-Pres-Q  
       b. *way-(i)-n-ka* → ‘for some reason’ (Lit. why is it?)  
       why-(be)-Pres-Q  
       c. *eti-(i)-n-ka* → ‘somewhere’ (Lit. where is it?)  
       where-(be)-Pres-Q  
       d. *eti-lo-(i)-n-ka* → ‘to somewhere’ (Lit. to where is it?)  
       where-to-(be)-Pres-Q

Despite the fact that the English translations do not seem to suggest that these forms belong to the category of adverbs, due to their appearance as phrases rather than single items, they are perceived as single words by the native speakers. However, the adverb (12)d has variants formed by substitution of the directional *-lo* ‘to’ with other directionals and locatives such as *-ey* ‘at’, *-eyse* ‘at’, *-pwuthe* ‘from’, etc. These other variants are also perceived as single lexical items as in such example sentences as: *Etieynka issta* ‘(It) exists somewhere’; *Etieysenka oassta* ‘(He) came from somewhere’; *Etilonka kassta* ‘(He) went somewhere’, etc.

2.2. INDEFINITE PRONOUNS. Seemingly identical processes produce indefinite pronouns, as illustrated in the following examples, where the indefinites developed from interrogative pronouns in (13), and from interrogative constructions in (14)–(16).

- (13) a. *nwukwu* ‘who’ → ‘someone’  
       b. *nwuka* ‘who:Nom’ → ‘someone’  
       c. *mwe* what → ‘something’

- (14) a. *nwukwu-(i)-n-ka*  
           who-(be)-Pres-Q  
           ‘someone’ (Lit. who is it?)  
       b. *nwukwunka-ka ne-l chacao-ass-ta*  
           someone-Nom you-Acc come:to:visit-Pst-Dec  
           ‘Someone came to see you.’ (Lit. ‘Who-is-it?’ came to see you.)
- (15) a. *mwe-(i)-n-ka*  
           what-(be)-Pres-Q  
           ‘something’ (Lit. what is it?)  
       b. *ku-ka mwenka-lul swumki-koiss-ta*  
           he-Nom something-Acc hide-Pres:Prog-Dec  
           ‘He is hiding something.’ (Lit. He is hiding ‘What-is-it?’.)
- (16) a. *mwues-ey-(i)-n-ka*  
           what-at-(be)-Pres-Q  
           ‘at something’ (what is it at?)  
       b. *ku-nun mwueseynka-ey moltwuha-koiss-ta*  
           he-Top at:something-at indulge:in-Pres:Prog-Dec  
           ‘He indulges in something.’ (Lit. He indulges in ‘What is (it) at?’)

From a historical perspective, interrogative pronouns have long been used throughout the history of Korean. For example, *nwukwu* and *mwues* (in their historical forms) were used in Middle Korean, and the use of *nwu*, etymologically related to the former, is attested even in earlier sources (M. Kim 2001:5–7). Interestingly enough, most attested data are used as interrogative pronouns and no instances show the indefinite pronominal uses derived from interrogative pronouns. It is hence reasonably hypothesized that such development is a recent one in history.

3. THEORETICAL IMPLICATIONS. The grammaticalization and lexicalization phenomena displayed by rhetorical questions have some important theoretical implications, of which we will discuss three major issues: intersubjectification, the grammaticalization-lexicalization continuum, and the grammar-lexicon continuum.

3.1. INTERSUBJECTIFICATION. From early grammaticalization studies, numerous mechanisms of semantic change have been proposed, such as metaphor, metonymy, inferences, etc. There also have been important generalizations of the nature of the semantic change, such as subjectification and intersubjectification (Traugott 1982 and 2003, Traugott & König 1991, and Traugott & Dasher 2002, among others). Crosslinguistically there is a strong tendency for words, particularly in grammaticalization, to acquire subjective, and further intersubjective, meanings over time. Intersubjectivity is closely related to ‘face’ and ‘image needs’ and may be most prominently displayed by honorification systems (Traugott 2003, Traugott & Dasher 2002).

Korean is a language in which honorification system is rigidly grammaticalized, and all sentences or fragments of sentences constituting an utterance must be properly



marked as mandated by the honorification and formality rules. Rhetorical questions, by virtue of being questions, albeit superficially, are fully marked with honorification feature of [ $\pm$ honorific] and formality feature [ $\pm$ formal], and at the same time, by resembling monologue more than dialogue in that they are not being given to the addressee as a finished product in a sense, they tend to be marked with [-honorific] and [-formal], because in a monologue the addressee is the speaker him/herself. Therefore, fully grammaticalized intersubjectivity markers are losing their intersubjective force in the course of grammaticalization. The impact of this loss in discourse is obvious: it is not uncommon that a social inferior uses these new discourse markers with [-honorific] and [-formal] marking in a discourse with a social superior, who may interpret them as normal sentences, and the speaker is deemed rude or offensive and this may result in conversational break-down. This potential risk is the price of these newly grammaticalizing markers with a high engaging power.

3.2. THE GRAMMATICALIZATION-LEXICALIZATION CONTINUUM. If we compare the development of indefinite adverbs in (11) and (12) on the one hand with that of indefinite pronouns in (13) through (16) on the other, we see that the processes involved are nearly identical. The major, or sole, difference seems to be that in the former the process operates on interrogatives denoting 'when', 'where' and 'how'; while in the latter on those denoting 'who' and 'what'. These different targets result in different classification of resultant formants, i.e. indefinite adverbs for the former and indefinite pronouns for the latter.

It is exactly for this reason that this is the area where the boundary of lexicalization and grammaticalization becomes unclear. The items in the single grammatical domain, i.e. interrogative pronouns, undergo seemingly identical processes, but produces different end-results in terms of the grammatical categories. According to the widely received concept of grammaticalization, there have to be different degrees of grammaticality between the source and the target, the latter being more grammatical. If we consider the category adverb more lexical than the category pronoun, as many do, the development of indefinite adverbs is clearly a lexicalization process and may, as some would argue, further qualify for de-grammaticalization, the reversal of a grammaticalization process<sup>3</sup>. However, the relative degrees of grammaticality for the categories interrogative pronouns and indefinite pronouns cannot be easily determined. If we consider that the end result category is clearly grammatical and developed from certain constructions, the case may be viewed as an instance of grammaticalization from certain perspectives. On the other hand, if we consider that interrogatives are more abstract than indefinite pronouns in that at least the latter has more concrete referential value (cf. 'who' vs. 'someone'), and thus assume that indefinite pronouns are more lexical than interrogatives, this process may qualify for an instance of lexicalization. From still another perspective, if the relative degrees of grammaticality of the two categories are thought to be undeterminable, this process may have to remain undefined.

3.3. THE GRAMMAR-LEXICON CONTINUUM. The phenomena discussed here also suggest that grammar and lexicon do not have a distinct boundary between them. A linguistic form fully compositional on the surface may function as a single grammatical item. This is in line with the notion of 'emergent grammar' (Hopper 1987) as opposed to a priori grammar. For some speakers, certain emerging forms may be used as grammatical markers, while for some speakers they may be still a combinatory string of lexical items.

Since rhetorical questions are fundamentally discursive and involve large chunks of linguistic strings rather than single words, their grammaticalization phenomena are unavoidably unclear in certain aspects, but at the same time effectively show that grammar and lexicon form a continuum rather than exist as two separate entities.

4. CONCLUSIONS. In this paper we have seen how certain rhetorical questions are grammaticalized into various discourse markers and how some of them are lexicalized. We have noted that some of these developments show the reversal of intersubjectification by losing their capabilities of directly reflecting the speaker-addressee relationship; that grammaticalization and lexicalization are not entirely discrete processes but intertwined, each even making use of certain identical processes; and that grammar and lexicon, rather than being two separate entities, form a continuum.

- <sup>1</sup> This research was supported by 2003 Research Fund of Hankuk University of Foreign Studies. My special thanks go to Professors Elizabeth Traugott and Shin Ja Hwang for their insightful comments and directing me to relevant literature. Any remaining errors, however, are mine.
- <sup>2</sup> For Korean data the Yale Transliteration System is used, and the abbreviations used for gloss are: Comp: complementizer; End: sentential ending; Fut: future; Neg: negative; NF: non-finite; Nom: nominative; Perf: perfect; Plup: pluperfect; Pres: present; Pst: past; Q: interrogative; Retros: retrospective; and Top: topic.
- <sup>3</sup> However, the question of whether this process can qualify as an instance of de-grammaticalization can be controversial, since this process *per se* does not reverse the grammaticalization trajectory (Elizabeth Traugott, p.c.). However, since there are diverse stances as to this issue which is compounded by terminological inconsistency with lexicalization, de-grammaticalization, re-grammaticalization, and anti-grammaticalization, there are positions that assert that all instances moving from more grammatical to less grammatical categories along the continuum are qualified to be labeled as de-grammaticalization (cf. Kim 1998, Ahn 2001, and the critique on this issue in Rhee 2003).

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# COORDINATION FROM A PROCEDURAL, TIME-LINEAR PERSPECTIVE

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THIS PAPER HAS TWO GOALS. First, to explore and define the concept of coordination viewed from the perspective of linear, real-time (i.e. time-linear) incremental accumulation of information as it occurs during natural language processing. Second, to examine a few problems concerning how the process of language understanding could be modeled and the sort of information which is accumulated during natural language processing done in left-to-right, linear conditions. First, a very brief overview of the theory adopted is presented. This is followed by a detailed, worked example designed to illustrate the theory and how it handles coordination phenomena. Finally, a few conclusions are drawn.

1. TIME-LINEAR GRAMMAR. The practice of symbolic communication is a defining trait of *homo sapiens*. We do this by receiving signals which are processed sequentially, in real-time. The products of these processing activities are accumulations of information which cover the entire range of knowledge and meaning significant to us. When we consider this notion, four questions immediately suggest themselves:

- a. How do we *effect* these transmissions?
- b. What is the *nature* of these transmissions?
- c. What is the *nature of the information* being transmitted?
- d. How do we *learn to effect* these transmissions?

Broadly speaking, there are three generic approaches that can be developed to any or all of these questions:

- i. the analysis of the prerequisites necessary for such transmissions (ante-transmission)
- ii. the analysis of the transmissions themselves (intra-transmission)
- iii. the analysis of the products of qua products (post-transmission)

Finally, the approach adopted to any or all of these analyses can be formal, semi-formal or informal. This paper adopts a semi-formal approach to analyze an example of the natural language understanding process (intra-transmission). Focus is placed on how the processes could be modeled and on what sorts of information are accumulated when the grammar is approached from an information-based time-linear

perspective. Discussion will be limited to a few typical phenomena which accompany and define the concept of coordination.

Recently, there has been a growing interest in the concept of procedural grammars that model knowledge of language from a left-to-right, functionalist, usage-based perspective: Dynamic Syntax (Kempson et al. 2001), Left-Associative Grammar (Hausser 1999), Markov Grammar (Tugwell 2002), Axiomatic Grammar (Milward 1994), Linearized Phrase Structure Grammar (Shin 1989) and Discourse Information Grammar (Sévigny 2002, 2002a, 2003). What distinguishes all of these approaches from the phrase-structural (PSG) tradition used in most varieties of generative grammar is the underlying and guiding metaphor. PSGs are based on the metaphor that natural languages are formal languages and that there exists an autonomous syntactic module which is mathematical in nature and independent of semantics. In contrast, the time-linear approaches see a grammar of a language as a series of procedures permitting humans to construct partial representations as a sentence is understood or (re)constructed. Thus knowledge of language is knowledge of the processes and information necessary to understand and use it. In the words of Tomasello (1998:xi):

‘But this dichotomy is false, because many linguists and psychologists believe that there is a biological basis for language, just not in the form of an autonomous Generative Grammar. Just as plausible for these linguists is the hypothesis that language rests on more general biological predispositions, such as the abilities to create and learn symbols, to form concepts and categories, to process information rapidly, and to interact and communicate with other persons intersubjectively’.

This paper uses Discourse Information Grammar (described in section 2) to approach the problem of coordination.

**2. DISCOURSE INFORMATION GRAMMAR.** The main goal of Discourse Information Grammar (DIG) is to model information accumulation during natural language processing. This requires a definition of information, an inventory of various units adapted to such modeling, and a set of constraint mechanisms to enable the processes to operate under the restrictions imposed by time-linear analysis. That is, (re)solutions must be achieved incrementally, with sufficient clarity to achieve unambiguous information networks whenever possible. To realize such goals, DIG relies on a lexicon whose entries are designed to meet these design goals. For instance, **Figure 1** represents a typical, though partial, schema for a lexical entry. (**Figure 2**, overleaf, is a schema for coordination linkers.)

It is important to note that a speaker’s personal lexicon is derived from processing needs, and only with experience does it become ‘a structured inventory’ (Tomasello 2003:6) of lexical entries stored within the speaker’s mind. The INDEX[ ] subfield and its values differ from language system to language system. For instance, a language such as Cree would use [+animate] and [+inanimate] as values for GENDER[ ] rather

|                 |                                 |
|-----------------|---------------------------------|
| <name>          |                                 |
| index:          | gender[ ], number[ ], person[ ] |
| CATEGORY:       |                                 |
| structure type: |                                 |
| sem:            | { ... }                         |

Figure 1. Standard lexical entry used in DIG.

than [+masc] / [+fem] / [+neuter], as in the case of, say, Latin. CATEGORY refers to the classification of words used by a language (the traditional and not so traditional parts of speech). This lexical field amounts to a claim that fluent speakers of a language have acquired and stored meta-information as well as semantic information. In DIG, CATEGORY is used closely with STRUCTURE TYPE in order to build up and close structures, as demonstrated in the worked example. The field SEM{...} signifies that the semantic attributes field is open. It gradually becomes increasingly specified as information accumulates. Information in DIG is usually not default-specified; it is accumulated to form networks of relations of various sorts. Information accumulation, at whatever level, can be in one of four states: (i) default-specified, (ii) partially specified, (iii) underspecified and (iv) unspecified. These specification states are editable and asynchronous. Moreover there must be a limit on how much information can be held unspecified and how long impending specification can be forestalled. The nature and properties of these limits are still subject to research. The basic principle at work concerning information specification is one of *minimal specification at any stage*. This allows the gradual and constrained growth of networked information-specifications to operate most freely because it reduces decision-time, thus lowering processing time. DIG uses various structures and units, each of which contribute complementary information parameters that, taken as a whole, yield a clear definition of information as it is used in DIG. Finally, DIG uses a small number of processes to assemble words and structures into greater units of information. Some of these are described in the examples below. For a more detailed exposition of the mechanics of DIG, see Sévigny 2003.

3. COORDINATION. In terms of linear, incremental processing and information accumulation, coordination presents a number of interesting questions, such as: What is the nature of coordination? What exactly is being coordinated? What sort of information is generated by the process of coordination? How is ellipsis handled during coordination? What pragmatic and contextual side-effects are generated by coordination? The classic definition of coordination is that of a relation, explicit or implicit which joins elements of equal status or type, be they clauses or, within a single clause, terms which have the same function in relation to the same word. Following are typical examples of coordination:

- (1) *L'hiver est fini et les hirondelles sont revenues.* (Grevisse 1989:382)  
Winter is finished and the swallows have returned.  
(Two sentences are coordinated)
- (2) *Déjà, il entrevoyait une explication plate et ennuyeuse et Freudienne et psychologique de sa nièce.* (Grevisse 1986:383)  
He could already anticipate a boring and dull and Freudian and psychological explanation from his niece. (4 adjectives are coordinated)
- (3) *Les petits enfants imaginent avec facilité les choses qu'ils désirent et qu'ils n'ont pas.* (Grevisse 1986:389)  
Little children imagine easily the things they desire and that they don't possess. (2 subordinate adjective clauses are coordinated)

At times, coordination is also used to join terms which seemingly differ in type. Such cases form examples of ellipses and are frequently used to achieve a form of emphasis.

- (4) *Elle était riche et contesse.*  
She was rich and a countess.

Usually, these cases involve two sentences, where the second sentence is reduced to the second term of a coordination, this second sentence often being built around the linking verb *être*.

In order to see the problem concretely from the perspective of incremental, linear processing, let us take example (1) above and stop at *et*:

- (5) *L'hiver est fini et...*

The coordinating linker *et* indicates that coordination has been triggered, but exactly what will be coordinated? We cannot rely on a post-facto tree structure, nor on a particular pattern mapping because at this point we do not know what the operands of the coordination will be. There must be some way of establishing the operands before the coordination can be completed.

Before we continue, we will consider a typical lexical entry for coordination linkers (**Figure 2**). The textual information is for monitoring and identification: the token name <et> which has no information attached to it prior to lexicalization and a running integer count to identify it in a discourse.

The lexical information consists of the token's lexical word *et*, its type, any semantic information which accompanies it. In this case, the linker 'et' connotes continuation and possibly elaboration and/or emphasis. There is also information to the effect that the linker normally has two operands, referred to as *left-operand* and *right-operand*. Moreover, these two operands normally agree as to type. In addition, no embedding is triggered, since coordination operates on operands which are of equal status, neither being subordinated to the other. This latter property is important for establishing the domain of operands. (For further details, see Sévigny 2002 and 2003.)



|                           |                                                                                                               |
|---------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>textual info</b>       |                                                                                                               |
| input-name                | < et >                                                                                                        |
| text-id                   |                                                                                                               |
| <b>lexical info</b>       |                                                                                                               |
| entry-name                | Et                                                                                                            |
| linker-type               | Coordination                                                                                                  |
| semantic info             | [+continuation], [+elaboration], [+emphasis],<br>left-operand <sub>type</sub> = right-operand <sub>type</sub> |
| logical pattern triggered | ^(left-operand, right-operand)                                                                                |
| triggers-polarity-change? | No                                                                                                            |
| no-of-args                | 2                                                                                                             |
| embeds-right-arg?         | No                                                                                                            |
| <b>procedural info</b>    |                                                                                                               |
| f-role triggered          | unification of left operand and right operand                                                                 |
| l-arg: type               | X                                                                                                             |
| l-arg:d-level             | n                                                                                                             |
| l-arg:logical role        |                                                                                                               |
| l-arg:head                |                                                                                                               |
| r-arg: type               | x                                                                                                             |
| r-arg:d-level             | n                                                                                                             |
| r-arg:logical role        |                                                                                                               |
| r-arg:head                |                                                                                                               |
| <b>links triggered</b>    |                                                                                                               |
| Lexical                   |                                                                                                               |
| Structural                |                                                                                                               |
| Functional                |                                                                                                               |
| Logical                   |                                                                                                               |
| Situational               |                                                                                                               |
| Anaphoric                 |                                                                                                               |
| Semantic                  |                                                                                                               |
| Topical                   |                                                                                                               |

**Figure 2.** Schema for coordination linker et.

The procedural information is underspecified because it is not possible, without context, to assign a functional role to coordinated objects. Nor is it possible to assign category or structure type to operands until these operands become known. As context and situation are built up, these values are specified.

The information concerning links triggered must also await incoming information before these connections can be made. Though procedural information and the links triggered are unspecified by default, they must be present in order to model the fact that

once a coordination linker has been partially processed as in (5) above, the receiver is put in a state of anticipation since the information is obviously not yet complete.

Fundamentally, the information accumulated as coordination is being processed falls into four general process categories: before the process commences, during the process, following the process and anticipated information. One possible model for this situation is presented in the following coordination algorithm:

#### COORDINATION ALGORITHM

1. in terms of the structure type, functional role (if available) and discourse level (if available), match the immediate first element of the right-operand up to and including any occurring separator against elements occurring to the left of the linker, beginning with the immediately preceding word/expression and proceeding on a right to left basis, if necessary
2. if there is type agreement and there is no functional role clash, and no discourse level discrepancy, initiate the left operand from that word/expression inclusive and assign the left-operand's functional role to the right operand element.
3. if there is a discrepancy in category value between the matching operands, check for a linking verb in the words preceding the linker. If a linking verb is present, bind/unify the right operand with the subject of the left operand. (the effect of such a binding/unification is equivalent to inserting the start of the left operand up to and including the linking verb before the right-operand.)
4. if there is no possible type agreement, repeat process 1 until a match is found or the left operand is exhausted
5. if the left operand is exhausted and there is no linking verb, signal an error (the case of an embedded phrase, set off by separators, is straightforward but not dealt with in this paper. Ex. *I went to the cinema and, because I had read the book, I did not enjoy the film.*)
6. continue processing the right-operand and match new items but follow a left to right order in the left-operand (since its start has been established). If a verb structure is skipped, bind the right-operand with the verb structure in the left-operand, provided the discourse levels agree.

4. COORDINATION: WORKED EXAMPLE. The purpose of this section is two-fold: 1) to illustrate how DIG accumulates information and collates it into information networks, referred to as 'information situations' and 2) to illustrate how DIG handles coordination. Let us begin with:

(6) Il a dit qu'il allait venir....

which yields the pre-coordination information in **Figure 3**.

| situation          |                                                                                                                                                                                                                                    |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| participants:      | 1. doer: ns-1 = $Il_1$<br>2. direct object: ns-2 = qu'il allait venir                                                                                                                                                              |
| events:            | event-1. [+process]: dire(il, qu'il allait venir)<br>temporal: [+past], [+punctual]<br>index: [+sg], [+3rd]<br>event-2. [+process]: venir(il, { })<br>temporal: [+remote future: aux:aller <sub>[+past], [+durative]</sub> + venir |
| complements: { }   |                                                                                                                                                                                                                                    |
| logical type:      | assertion                                                                                                                                                                                                                          |
| logical structure: | P(x .. ??): ??terminator/linker/modifier:adv                                                                                                                                                                                       |
| semantic field:    | dire(il, venir)                                                                                                                                                                                                                    |
| topic chain:       | dire <sub>predicate</sub> (il, venir <sub>direct object</sub> )                                                                                                                                                                    |
| DISCURSIVE TYPE:   | narration/description                                                                                                                                                                                                              |

**Figure 3.** Information accumulated in example (6).

4.1. COMMENTS. So far, not much information has accumulated. In terms of the information situation, the first participant is associated with  $il_1$ . By default, it is associated with an indefinite reference *quelqu'un*, but this specification can be overridden as soon as more information is accumulated. There is a second nominal structure in the form of a que-clause which is assigned the functional role of direct object. Two events, both of type [+process], have been accumulated. This information will be used to assign the text DISCURSIVE TYPE [+narration/description]. The LOGICAL TYPE is assertion. The LOGICAL STRUCTURE, given the lack of any indication contrariwise, is a simple, as yet incomplete proposition, indicated by P(x .. ??) where the two periods indicate incompleteness and the double question marks indicate anticipation of more information. The string 'terminator / linker / modifier:adv' indicates a feasible set of possibilities. (It could end right there, or be followed by a linking word, an adverbial expression, etc. Further anticipated strings are not indicated to preserve space.). So far, the SEMANTIC FIELD is centered on the event 'dire(il, qu'il allait venir)', which belongs to the generic event type of reporting.

If we now process the coordination linker *et*, a few additions are made, some of which require modification to **Figure 3**. New information is indicated in **bold** in **Figure 4** (overleaf). Information that has already been integrated appears unbolded. (After this, only **new information** is indicated in schematic summaries.)

(7) Il a dit qu'il allait venir et...

Very little has changed. The logical type has altered slightly from mere assertion to a modified form of assertion triggered by the semantic values of the linker *et*. Also added is the as yet unknown left-operand and an anticipation (indicated by the double

| situation              |                                                                                                                                                                                                                                    |                               |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| participants:          | 1. doer: ns-1 = Il <sub>1</sub><br>2. direct object: ns-2 = qu'il allait venir                                                                                                                                                     |                               |
| events:                | event-1. [+process]: dire(il, qu'il allait venir)<br>temporal: [+past], [+punctual]<br>index: [+sg], [+3rd]<br>event-2. [+process]: venir(il, { })<br>temporal: [+remote future: aux:aller <sub>[+past], [+durative]</sub> + venir |                               |
| complements: { }       |                                                                                                                                                                                                                                    |                               |
| logical type:          | assertion + <b>continuation/elaboration:</b>                                                                                                                                                                                       |                               |
| et: left-operand = ??; |                                                                                                                                                                                                                                    |                               |
| right-operand = ??     |                                                                                                                                                                                                                                    |                               |
| logical structure:     | P(x ..?): ??                                                                                                                                                                                                                       |                               |
| semantic field:        | dire(il, venir)                                                                                                                                                                                                                    |                               |
| topic chain:           | dire <sub>predicate</sub> (il, venir <sub>direct object</sub> )                                                                                                                                                                    |                               |
| DISCURSIVE TYPE:       | narration/description                                                                                                                                                                                                              |                               |
| LINKS TRIGGERED        | IN CURRENT SITUATION                                                                                                                                                                                                               | ANTICIPATED INFORMATION       |
| Lexical                |                                                                                                                                                                                                                                    |                               |
| Structural             | left-operand = ??                                                                                                                                                                                                                  | right-operand = <b>type??</b> |
| Functional             | il <sub>subject</sub>                                                                                                                                                                                                              | ??                            |
| Logical                | P(x..)                                                                                                                                                                                                                             | P(x .. ) - P(x)               |
| Situational            | participant-1= doer<br>participant-2 = <b>direct</b><br><b>objects: que clause</b>                                                                                                                                                 |                               |
| Anaphoric              | il                                                                                                                                                                                                                                 | ??quelqu'un                   |
| Semantic               | dire(il, venir(il, { }))                                                                                                                                                                                                           | ??                            |
| Topical                | dire(il, ...) + venir(il, ...)                                                                                                                                                                                                     | ??                            |

**Figure 4.** Information accumulated in example (7).

question marks) that a right operand is forthcoming. At this point, the information accumulated has modeled several items:

- (a) the acknowledgment that the type assertion still holds and is not yet complete;
- (b) a sense of anticipation that more information is forthcoming and relevant to the completion of the current information. Part of this information is indicated in the third column of the links triggered schema. This role being played by anticipation is typical in DIG: as information is accumulated, specifications are made, constraints are brought in, and anticipations are created. Although default decisions or specifications are made as soon as possible, it is always

| situation       |                                                                                                                                                                                                                          |                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| participants:   | <b>4. doer: ns-3 = 'il<sub>5</sub>' : il<sub>1</sub> = il<sub>5</sub> or il<sub>1</sub> ≠ il<sub>5</sub></b><br><b>Default resolution: il<sub>1</sub> = il<sub>5</sub></b><br><b>3. direct object: ns-4 = 'qu'il...'</b> |                                                            |
| events:         | <b>event-3. [+process] ??</b>                                                                                                                                                                                            |                                                            |
| logical type:   | 'et': left-operand = <b>qu'il allait venir</b> ;<br>right-operand = <b>qu'il... ??</b>                                                                                                                                   |                                                            |
| LINKS TRIGGERED | IN CURRENT SITUATION                                                                                                                                                                                                     | ANTICIPATED INFORMATION                                    |
| Lexical         | il-1: [+animate], [+sg],<br>[+masc], [+3rd]                                                                                                                                                                              | il <sub>5</sub> : [+animate], [+sg], [+masc],<br>[+3rd]    |
| Structural      | left-operand = type:sentence:<br><b>que-clause</b>                                                                                                                                                                       | <b>right-operand = type:sentence:</b><br><b>que-clause</b> |
| Functional      | il-1 <sub>subject</sub> + allait venir                                                                                                                                                                                   | il <sub>5subject</sub> ??event[+process]                   |
| Logical         | P(x..)                                                                                                                                                                                                                   | ??P(x)                                                     |
| Situational     | participant-1= doer<br>participant-2 = direct object:<br>que-clause                                                                                                                                                      | ??participant-3 = direct object:<br>que-clause             |
| Anaphoric       | <b>il<sub>1</sub> = 'quelqu'un'</b>                                                                                                                                                                                      | il <sub>1</sub> = il <sub>5</sub>                          |
| Semantic        | dire(il, venir(il, {}))                                                                                                                                                                                                  | event2:[+process](il, {direct<br>object, compl})           |
| Topical         | dire(il, ...) + venir(il, ...)                                                                                                                                                                                           | event[+ process](il, ...)                                  |

**Figure 5.** Information accumulated in example (8).

possible to edit these specifications, if necessary. This models our ability to constantly update the information we have already processed. The anticipation is necessary in order to reduce the complexity of decision-making necessary even given the severe time limits under which normal natural language processing occurs regularly.

- (c) a sense of wondering what is being coordinated, indicated by the fact that we know nothing about the right-operand yet and consequently know nothing of what the left-operand will be.

If we now continue with *qu'il...*, we obtain (8):

(8) *Il a dit qu'il allait venir et qu'il...*

This permits a few specifications to be made to **Figure 4** and affects the situation contents as well. Only new information is indicated in **Figure 5**.

At this point, new information consists of the addition of the new nominal structure *il* which could be an echoing of the original *il* or be a reference to another third party. By default, the ambiguity is resolved to the echoing of the original *il*. This

| situation          |                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| participants:      | 3. direct object: ns3 = ‘qu’il <b>allait finir le travail.</b><br>5. direct object: ns5 = ‘le travail’                            |
| events:            | event-3. [+process]: <b>finir(il, le travail)</b><br>temporal: [+remote future: aux:aller <sub>[+past], [+durative]</sub> + finir |
| logical type:      | ‘et’: left-operand = qu’il allait venir;<br>right-operand = qu’il <b>allait finir le travail</b>                                  |
| logical structure: | P(x)                                                                                                                              |

Figure 6. New information accumulated in example (9).

models our normal assumption that, barring no conflict or additional indications, we assume a non-change of referents in such a context. Still, the possibility exists and, if necessary, the default assignment can be modified later. The appearance of the *qu’* in *qu’il* indicates that two *que*-clauses are being coordinated. This allows us to specify the left-operand as *qu’il allait venir*. The information contained in *qu’il allait venir* is not new information, but the fact that it has become the left-operand is new. Anticipation is created in two areas: the expectation that the right operand will be completed (*qu’il... ??*) and that it will contain an event, probably of type [+process].

If we now complete this example with *allait finir le travail*, we obtain (9), which yields the situation in Figure 6:

(9) *Il a dit qu’il allait venir et qu’il allait finir le travail.*

When the terminator period is processed, it triggers a series of actions which initiate the first complete discourse information unit. In a situation as simple as that schematized in (9), very little needs to be done. In this case, the situation receives final specifications: the third participant is completed, a fifth is added and completed. The anticipated third event does turn out to be marked [+process]. It is completed as well. Under logical type, the right operand is specified and completed. Finally, the incomplete status of [assertion + continuation] is closed, indicated by the new state: P(x). There is no anticipation created at this point. The text is closed. In a longer, more involved example, however, various links would create various anticipations. The process would continue until the text were marked as complete or terminated.

5. CONCLUSIONS. Coordination, considered from the linear incremental perspective is a complex process. Information from four stages is involved: before coordination, during coordination, following coordination and anticipated information, all accumulated along a dozen or more parameters (See Figure 2). In addition, coordination requires a pausing mechanism and a search algorithm in order to identify its left and right arguments. Finally, a variety of links are usually triggered between the left and right arguments.

Applying DIG to a straightforward sentence containing coordination has yielded a partial answer to the questions raised at the start of the paper. First, humans effect

verbal transmissions in a time-linear fashion by constructing progressively more specified networks of information, in small increments that involve a minimal number of specifications. Second, the nature of these transmissions is incremental and often involves various patterns and specifications as well as inference-based anticipation. Moreover, it is contextually constrained and editable. Third, the nature of the information being transmitted involves a number of complementary parameters: lexical, structural, functional, pragmatic, semantic, logical and discursive, among others. Fourth, and more speculatively, there is a strong suggestion from the results that we learn to effect these transmissions through usage and experience, a supposition which appears to tie in well with current cognitive-functionalist speculations concerning the non-autonomy of syntax.

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## NEW LINGUISTIC PERSPECTIVES IN A POST-SEPTEMBER 11TH WORLD

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THE EVENTS OF SEPTEMBER 11 suddenly and dramatically changed America, leading to two wars abroad as well as numerous changes in policy, law, and lifestyle related to the ongoing war on terrorism. Americans became more fearful and suspicious, and more interested in Islam.

Of course, major changes in social circumstances and ways of thinking are typically reflected in linguistic innovation, including the introduction and spread of new or newly popular words and expressions, and the development of new bases for creativity in rhetoric (Hock 1991). Thus in the September 11 coverage of the three major U.S. newsmagazines during the six months following the attacks, 89 Arabic, Persian, and Afghan words or expressions are introduced, and expressions like 'axis of evil', 'connect the dots', and 'let's roll' are frequent (Tsiang 2003)<sup>1</sup>. A recent article about Tina Connor, the woman whose affair with Kentucky governor Paul Patton helped destroy his career, describes her as a 'Woman of Mass Destruction', and, because the attention she brought on the affair destroyed her business, an 'unwilling suicide bomber' (Keeling 2003). And the 2002 valedictorian of Harvard proposed a commencement speech entitled 'My American Jihad' (Didion 2003).

What is particularly interesting to consider with respect to September 11 effects on language is the fact that the terrorist attacks are referred to as an event of such proportion that it changed the world for Americans, who now live in a 'post-September 11 world'. To the extent that language reflects worldview, we can consider how speakers and writers have reacted to the new realities by adjusting their language and we can expect many changes<sup>2</sup>. Moreover, the importance of becoming familiar with the ways of thinking of Muslim and Arab peoples in order to understand today's terrorism puts us into contact with a variety of worldviews. If Osama bin Laden would view the scantily clad pop singers Britney Spears and Jennifer Lopez as 'chadorless', then shouldn't we be embarrassed as well (*Time Magazine* 29.October 2001)?

This paper focuses on examples from popular usage that represent linguistic reflections of new perspectives on our world that have become relevant since September 11, 2001. As such, these examples illustrate the impact of September 11 on our language and on us.

1. CORPUS AND METHODOLOGY. The corpus studied consists of 278 hour-long transcripts of the CNN news-interview programs *Connie Chung Tonight* (186 transcripts representing the entire run of the show from 24.June 2002 to 19.March 2003) and *Larry King Live* (92 transcripts representing all shows between 4.March 2003 and

20 June 2003). The earliest transcript in the corpus is from 24 June 2002, more than nine months after the September 11 attacks, by which time related stories are no longer the sole focus of news reporting.

Both of these programs focus on main stories in the news. The topics discussed include current events, famous or important people such as entertainers, politicians, and journalists, and lifestyle issues such as health and relationships. During the programs, hosts Connie Chung and Larry King converse with an invited guest or panel of guests based on prepared questions and spontaneous follow-up questions. Occasionally relevant video clips are inserted. Sometimes at the end of *Larry King Live*, callers from the U.S. and abroad phone in to ask questions. Though Connie Chung and Larry King, as well as many of the guests, are professionals whose main tool is language, and some of the material is prepared, most of each show consists of spontaneous conversation.

The programs in the corpus covered a range of topics, though quite a few of them were devoted to the war in Iraq; the case of Elizabeth Smart, the young girl who was kidnapped in 2002 from her home in Utah by a polygamist and rescued nine months later; and the case of Laci Peterson, a beautiful pregnant California wife who went missing on Christmas Eve 2002 and whose body was later found on the shore of San Francisco Bay, along with that of her unborn child. What is interesting is how relevant the topic of September 11 is to stories of all kinds. Thus among the 278 transcripts, the expressions *September 11* or *9/11* appear in 120 of them, and references to September 11 events or the continuing war on terrorism occur within a variety of contexts.

Thus at first it was feared that the Washington-area sniper attacks in fall 2002 and the explosion of the space shuttle Columbia in February 2003 were connected with terrorism. The mineshaft where nine trapped coalminers were dramatically rescued in the summer of 2002 was located near the Pennsylvania field where the fourth plane hijacked on September 11 crashed. There was concern that the new Lord of the Rings movie, *The Two Towers*, might be mistaken for a reference to September 11. And September 11 is even relevant to the Laci Peterson case, because a new executive order of Attorney General John Ashcroft involving Homeland Security legislation may affect the admissibility of wiretapped conversations between accused husband Scott Peterson and his attorney.

Examples for the study were collected based on whether they seemed likely to be something someone would not have said, or would not have said that way, prior to September 11. This included examples of words, expressions, and rhetoric related to the events of September 11, Islam and the Arab world, the war on terrorism, and the war in Iraq. The war in Afghanistan was largely over by the time period represented in the corpus. These examples, presented in the following sections, provide linguistic evidence of the ways our world and our thinking about it have changed since September 11.

## 2. THE DEVELOPMENT OF NEW CULTURAL REFERENCE POINTS.

2.1. *9/11* AND *SEPTEMBER 11*. As noted above, the terms *9/11* and *September 11* frequently appear in a variety of contexts. The expression *9-1-1* did not occur as a variant,

probably because it has evoked the meaning of the emergency phone number for years. Nor do other paraphrases appear frequently, though *attacks on the Twin Towers* is occasionally found. This is probably because their common time is the convenient way to generalize across a range of events; i.e. the attacks in New York, the attack on the Pentagon and the thwarted attack that ended in Pennsylvania. And once these terms caught on, they became the conventional expressions.

The terms *9/11* and *September 11* are mainly used in two functions; to refer to the date of the terrorist attacks, or the terrorist acts themselves. Both functions may even appear in the same sentence, as in: 'Ramzi Binalshibh was able to get a message finally to bin Laden that 9/11 was going to happen on 9/11' (CC 13.September 2002). However, examples of extended usage occur as well.

Some of these are no doubt based on the fact that September 11 is a time reference. So it functions well as a transition marker signaling the divide between the old world and the new, as in the expression *post-September 11 world*; and comments like 'You know, we once felt strongly about that after 9/11' (LK 11.March 2003). Nearby dates gain meaning too, as in 'Well, on a scale of 1 to 10 I would say we were probably at a 1 on September 10' (CC 19.February 2003).

As a real date, September 11 is perfect in the question, 'Where were you on September 11?' frequently asked of guests by Larry King. That is an update of the question asked following the assassination of President John F. Kennedy, 'Where were you when the President got shot?' It is a date no one will forget and this will help it maintain significance. On September 11, 2002, a year after the attacks, two Sikh airline passengers who changed their seats and spent a long time in the same bathroom were arrested, which they considered unjustified. Connie Chung explains it briefly: 'Here it was September 11. And the behavior was a little odd' (CC 23.September 2002).

September 11 is also used as a reference or measure word for future catastrophic events. Thus we must work to prevent 'future September 11s' or a 'replay of 9/11' (CC 25.July 2002 and 27.June 2002). Saddam Hussein's son Uday warns the U.S. against attacking Iraq, noting that their reprisal would make September 11 seem like a 'picnic' (CC 24.January 2003). War with North Korea is imagined as: 'War isn't pretty. You think about September 11 and imagine it on a scale of 10 or 100 times that' (CC 9.December 2002). And if international terrorist networks obtain weapons of mass destruction, 'We wouldn't be [talking] of 3,000 killed on 9/11 but 30,000, 300,000 or even three million' (LK 5.April 2003).

Of course it is not unusual to imagine one conflict in terms of another (Ammer 1999, Hughes 2000). Thus we want 'no more Vietnams', Mogadishus, or World War III. But considering the idea that we didn't anticipate September 11 because of a 'failure of imagination', we seem to have suddenly become more open-minded. Thus when the mid-Atlantic coast was terrorized by 'the sniper' we could wonder if we were dealing with 'a killer or killers who fit no pattern, no classic profile, some new strain of evil' (CC 25.October 2002).

On the other hand, we can also observe the integration of September 11 without its dramatic connotations into cultural background knowledge. Thus, rhetorically, it is

almost casually introduced into the topic of interfaith unity in the following remark: 'What I meant to say is that before 9/11, Muslims in this country were just starting to enter into religious dialogue with Jews and Christians... and then 9/11 came along and just complicated the whole thing' (LK 20.April 2003). And we can find the date used as a temporal reference point in contexts having nothing to do with terrorism: 'Larry Hagman, wrote an autobiography called *Hello [Darlin']*. It came out around 9/11, '01' (LK 2.June 2003); and 'I'm not sure exactly. It was September, October, after September 11, somewhere in there' (CC 11.July 2002).

As an expression that evokes the entire September 11 tragedy that is shared cultural knowledge, the mention of September 11 can be used to explain everything, as in a deflection or an excuse. A mother accused of child abuse by the nanny she hired explains about the reference check of her potential employee, who may have had a history of making such accusations: 'Checked out. I couldn't get in touch with one or two. The numbers were either stale, or I was told there was a family that had a tragedy related to 9/11' (CC 1.January 2003). And the mother of a police officer who was charged with assault on a suspect would like to see her son back on duty, reminding us: 'Right now, we're in the middle of a tragedy in this country. Has everybody forgot about 9/11? We need our police officers' (CC 18.July 2002).

**2.2 OSAMA BIN LADEN AND THE DEVELOPMENT OF NEW SENSITIVITIES.** Osama bin Laden, considered 'mystical' and 'legendary' among Muslims and Arabs, has become a new cultural reference point as well (LK 14.April 2003). Egyptian president Hosni Mubarak warned that a U.S. attack on Iraq could result in 'a hundred more bin Ladens' (LK 4.April 2003). In a Larry King interview following the publication of Hillary Clinton's memoirs, Clinton tries to explain how she put aside her personal pain when she found out about her husband's affair with intern Monica Lewinsky because she had to support 'the president'. Nothing showed her up more clearly than Larry King's question: 'I mean you didn't go to bed thinking about bin Laden?' (LK 10.June 2003).

On the other hand, when actor Don Johnson is stopped at the German border, he apparently jokes 'See Yasser Arafat' (LK 14.March 2003). There is still sensitivity concerning September 11, so every rhetorical opportunity is not to be exploited. No jokes about September 11 itself appear in the corpus, though some humor is found at the expense of Osama bin Laden and Saddam Hussein. For example, tapes of Osama bin Laden are significant when we don't know whether he is alive or dead, and it was noticed that a tape of his surfaced just when *Time Magazine* was selecting their featured Man of the Year (CC 22.November 2002). A witty remark of former President George H.W. Bush about Saddam Hussein is quoted in the Conclusion.

**3. REFLECTIONS OF INTERACTION WITH ISLAM AND THE ARAB WORLD.** It is unlikely that many Americans knew Islamic dress by name prior to the War in Afghanistan. So it is very interesting when ordinary people label Islamic-looking dress they see on westerners, in America, using authentic terminology. Thus one of the initial spotters of Utah kidnap victim Elizabeth Smart describes her at discovery as wearing a *burqa*;

what another describes as a T-shirt pulled over her head like a veil (CC 13.March 2003). Michael Jackson's children's faces are typically covered in public, allegedly for their protection. An observer of the children wearing veils beneath hats during a zoo outing recalls them as wearing 'burkas' (CC 10.December 2002).

Among other Islamic or Middle East related words or phrases appearing in the corpus, *jihad* 'holy war' appears 11 times, 6 times without accompanying explanation; *Inshallah* 'God willing' 3 times, without explanation; *Allah* 'God' once, without explanation; and *Ramadan* 'Islamic holiday' once, without explanation. All other examples occur with explanation following or in nearby context, including *Allah Akbar* 'God is great' (3 times), *fatwa* 'religious decree' (3), *sharia* 'Islamic law' (2), *imam* 'cleric' (1), *hajj* 'pilgrimage' (1), and *sheikh* 'title of respect' (1). All of these foreign words are used in literal contexts, except the three instances of *Inshallah*, illustrated further below.

In other instances where an Islamic or Middle Eastern term would be appropriate, translations or paraphrases occur alone. For example, translated quotes of Osama bin Laden often contain the expression 'by the grace of God', and the so-called 21st hijacker Zacarias Moussaoui, who did not join the September 11th mission but was believed to have trained for it, is described as offering a 'prayer to God' (not Allah) during his court appearance (CC 25.July 2002). But more inclusion of foreign vocabulary may convey the Islamic or Arab world more realistically. The English phrasing in the indictment for Richard Reid, the so-called shoe-bomber who attempted to blow up the plane on which he was a passenger, after September 11, fails to convey the passions typically associated with Middle Eastern-type suicide bombers: 'Reid was an Islamic extremist engaging in acts of international terrorism while on a martyrdom mission' (CC 3.October 2002).

On the other hand, while Americans have become more familiar with Islam and the peoples and cultures of the Middle and Near East, the foreignness of the Islamic world may be highlighted. For example, an American mother who converted to Islam and is involved in a court case against her parents, who want to bar her from taking her son to be raised in Egypt, points out: 'They say this is not a racial issue—or a religious issue. Yet in the very affidavit they use against me, they attach a picture and they say that my very declaring myself a Muslim is bizarre' (CC 22.July 2002). So, rhetorically, Islam can represent the striking counterpoint. Thus the man who wanted his daughter not to have to recite the Pledge of Allegiance in school also opposes the design of American currency, and asks: '...can you imagine the Christians in this nation every time they paid for something had to say in Mohammed we trusted?' (CC 26.June 2002).

So an Islamic world is the alternative one. Two panelists on *Connie Chung Tonight* use the Islamic expression *Inshallah* 'God willing' to illustrate a world that is no longer normal (CC 10.March 03):

Webb: All sorts of things could happen by then. Christopher could be secretary-general of the United Nations. I could be Connie Chung's chief researcher. All sorts of oddness could take place.

Hitchens: Inshallah. Inshallah.

Webb: Inshallah. Exactly.

On the other hand, it is probably Christianity's *Satan*, not Islam's *Shaitan*, that is intended in a musing on what it might take for President George W. Bush's approval rating to go down after his State of the Union speech: 'I suppose, if a president got up and yelled, all power to Satan, approval ratings wouldn't go up' (CC 28.January 2003).

4. VIEWING OUR WORLD THROUGH THE LENS OF TERRORISM. September 11 was unanticipated. No one realized until too late that their neighbors or classmates or fellow passengers were in fact trained terrorist suicide-bombers. But since the attacks, Americans have become primed to see the people around them as terrorists; and accidents, disasters, and incidents of violence as terrorist acts. And this atmosphere of constant suspicion is fueled by government encouragement of the citizenry to be vigilant.

We can observe the tendency to see the world in terms of terrorist/terrorism in the remarks of Reverend Al Archer, director of the Lighthouse Mission, about sniper suspects John Muhammad and Lee Boyd Malvo, who stayed at the mission before they were connected to the Washington-area sniper attacks, but after September 11. Noticing that unlike other homeless residents, Muhammad was clean-cut and dressed well, had money to travel, received a phone call from a travel agency, and did in fact travel, he concluded: 'We didn't know exactly what it was that was bothering us. But it caused me personally to think that he was involved in some type of a group who had plans to cause some destruction to our country' (CC 28.October 2002).

Most disasters in the news, including the Washington sniper attacks and the explosion of the space shuttle Columbia, were at first suspected of being terrorist acts.

Reverend Jesse Jackson, commenting on the Chicago nightclub fire that killed 21 in early 2003 reenacts the scene as follows: 'So, somebody says poison gas, somebody says terror, somebody says bin Laden. And, of course, there is a dash for the door' (CC 18.February 2003).

And so the labels *terrorism* and *terrorist* become rhetorical terms of significance. Thus, President George W. Bush is called an 'international terrorist' on a T-shirt and a school principal who doesn't allow a student to wear one to school is called a 'school terrorist' (CC 20.February 2003). The child of one of the Sikhs detained for behaving suspiciously on a plane on September 11, 2002 is taunted with the epithet 'son of a terrorist' (CC 23.September 2002). And a caller asks a panel of religious experts on the *Larry King Live* show, 'What are their views about Islam? Is it a terrorist religion...' (LK 11.March 2003). Countries the U.S. would like to inspire its citizens' feelings against are labeled terrorist states. So President George W. Bush declares in a press conference making the case for war in Iraq: 'The attacks of September the 11th, 2001 showed what the enemies of America did with four airplanes. We will not wait to see what terrorists or terrorist states could do with weapons of mass destruction' (LK 6.March 2003).

Consequences for corporate crooks are compared to those for terrorists in the following passage, that begins with former *Daily Show* correspondent Brian Unger playing a video clip of President George W. Bush (CC 7.December 2002).

Bush: They made a mistake, they attacked a great nation, and this nation will do whatever it takes to defend freedom and to bring people to justice.

Unger: OK. That was Bush talking about terrorists.

Chung: Thank you, I didn't know that.

Unger: I know. But just imagine, if you will, from a president who campaigned on how safe it is to invest our Social Security pensions in the stock market, just how harsh the penalties will be for corporate crooks.

The normality of the *terrorist* label is interesting, since this was the shocking half of the classic illustration of propaganda, *freedom fighter* vs. *terrorist*. So the idea of terrorism is pushed further in the post-September 11 world. We can find mention of a new conception of terrorism in the discussion of the Washington sniper attacks, in passages like, 'However, there is absolutely no evidence, not one shred of evidence to suggest that this is a terror-related attack, terrorism as has been defined in the last 12 months, since September 11' (CC 15.October 2002) and 'And, obviously, there's a question about the perpetrator. Are they connected with terrorism, just the whole notion of what terrorism is? Certainly, part of this crime seems to be to intimidate millions of people, in addition to the victims who have suffered so grievously' (CC 15.October 2002).

And so terrorism becomes part of our everyday world, or 'the new normal', another current popular phrase occurring in the corpus. Yusra Awadeh, a Palestinian-American high school girl, who was searched for possession of controversial pro-Palestinian stickers such as had been placed around her school, described her experience as follows: 'I looked like a terrorist when they were searching me. Taking off my shoes? What is it, an airport?' (CC 21.November 2002).

5. REFLECTING ON OUR WORLD FROM THE VIEWPOINT OF OTHERS. At the time of the War in Afghanistan, Deputy Director of Operations for the Joint Chiefs of Staff John Stufflebeem observed, 'The more that I look into it and study it from the Taliban perspective, they don't see the world the same way we do' (Didion 2003). In fact, considering ourselves the way others see us can be an enlightening viewpoint.

For example, we are almost forced to admit we are ridiculous by the way the rhetoric develops in the following exchange between Iraqi ambassador Mohammed Aldouri and Connie Chung about whether Iraq has any weapons of mass destruction. Connie Chung begins with the question '[D]oes Iraq have any nuclear weapons?' and proceeds to ask whether Iraq has any 'development of nuclear weapons', 'Mustard gas', 'Anthrax', and so forth. To each of her nine questions of this type, Aldouri answers with brief replies like 'Not at all', 'Absolutely not', 'No', and so forth. Finally, Connie Chung asks: 'Does Iraq have anything that could be misconstrued as chemical or biological or nuclear weaponry?' and receives the answer 'Not at all' (CC 6.December 2002).



The Iraqi has been asked to consider the matter from the American point of view, which thereby appears foolish.

Considering matters from a very different point of view could be achieved by taking the Taliban perspective. For example, how better to reflect on excess in American culture than to consider it through ultra-conservative Taliban eyes. CNN correspondent Anderson Cooper recalls watching in Afghanistan together with Afghan men a *Larry King Live* interview of voluptuous former Playboy Playmate Anna Nicole Smith, widow of the billionaire husband she married when she was 26, and he 89: 'And I got to tell you, they were transfixed... These guys had never seen anything like her. They were stunned. And Kabul audiences are not easy... Deploy her in the field, she can stun battalions of Taliban' (CC 16.July 2002).

The label of Taliban appears to function as a rhetorical reference point in the case of John Walker Lindh, the young American found amidst Taliban fighters in the battle at Mazar-e-Sharif, Afghanistan, who is at first referred to as 'the American Taliban', but later as 'Taliban American' (e.g. CC 12.July 2002 and 3.October 2002). This reversal may suggest a change in attitude as Americans began to understand him as a confused youth, rather than an extremist, or the reluctance of Americans to take up possibilities offered them to look at the world from the perspectives of others.

Thus, September 11 made it important to understand how we are perceived in the Arab or Islamic world and brought to the fore new points of view, enriching American thinking and American rhetoric with new possibilities for contrast.

6. CONCLUSION. The examples presented illustrate vocabulary, expressions, and ways of speaking that appear to reflect changes September 11 brought for Americans and American life. However, though there is frequent mention of September 11 and many examples of September 11 language effects, there is no dramatic language change that would correspond to a dramatic social change. Language is not that kind of mirror. Moreover, we may be less affected than we imagined or would like to imagine. The passionate feelings that accompanied the tragedy are certainly less intense as time has passed and America has not experienced any further large-scale terrorist attacks. The colorful character of Osama bin Laden and the exotic world of Afghanistan have largely faded from the news.

So it seems that Taliban counterpoints, Islam in English, and other legacies of September 11 will not endure as continuing influences on the development of English, and the joke will never become 'A priest, a rabbi, a minister, and an imam were sitting in a boat'. While we might find an example from a carefully crafted written text like 'With U.S. forces in Afghanistan zeroing in... one was tempted to imagine that Osama bin Laden and his top men were burning in an-Nar, the Koran's hell' (*Time Magazine* 26.November 2001); more common is, and probably will be, the American way of talking, as in former president George H.W. Bush's comments about Saddam Hussein, comments that do not overtly draw on Islamic theology: 'And I have nothing but hatred in my heart for him. But he's got a lot of problems, but immortality isn't one of them' (CC 17.September 2002). So in the end our language will rely for its



references and perspectives on the culture firmly in place, with new ones integrated here and there, reflecting our continuing cultural experience.

- <sup>1</sup> 'Axis of evil' is the term President George W. Bush used to designate Iraq, Iran, and North Korea. A failure to 'connect the dots' became the conventional form of criticism that U. S. intelligence efforts failed to predict September 11. 'Let's roll' were the last words of Todd Beamer, associated with leading the attack on the hijackers that led to the fourth hijacked plane crashing in a Pennsylvania field.
- <sup>2</sup> That language reflects worldview is the related claim of the Sapir-Whorf Hypothesis that maintains that language influences or even determines worldview. According to Edward Sapir (1929), 'The fact of the matter is that the "real world" is to a large extent unconsciously built up on the language habits of the group... We see and hear and otherwise experience very largely as we do because the language habits of our community pre-dispose certain choices of interpretation'. His student Benjamin Lee Whorf concluded 'We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way—an agreement that holds throughout our speech community and is codified in the patterns of our language' (Carroll 1956).

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## A COMPARATIVE STUDY OF CHINESE AND ENGLISH ANAPHOR USE IN DISCOURSE

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CROSS-LINGUISTIC RESEARCH (Chen 1984, Clancy 1980, Givón 1983, Pu 1997) has shown that there is a universal referential management (URM) rule that determines the use of third person anaphoric forms in discourse. That is, the more continuous a topic is, the less coding material it needs to maintain the topic. Thus, referents that are mentioned continuously with no intervening referents are more likely to be maintained by a zero anaphor (anaphor with no phonological content) as opposed to a lexical anaphor (commonly known as a pronoun) or a definite full noun phrase. Chinese and English have been found to be of no exception to this discourse rule in their anaphor use, although studies have shown that cognitive and pragmatic factors also contribute to such use (Ariel 1994, Pu 1991, Huang 1994).

However, in spite of being equipped with this URM rule as a guiding principle, second language learners of Chinese whose native language is English have constantly found themselves struggling with the appropriate use of anaphoric forms in their Chinese discourse (Charters 1997). This is especially evident when the choice between a lexical and zero anaphor is primarily determined by discourse constraints. Therefore, a comparative study focusing on the use of lexical and zero anaphors was conducted to find out the anaphoric behaviors exhibited by native Chinese and English speakers. Specifically, it looked at such behaviors on the discourse level, where topic continuity, a characteristic of discourse, plays an essential role. In this study, three research questions were addressed,

1. How do Chinese and English speakers use lexical and zero anaphors in their discourse?
2. Where in discourse do Chinese and English speakers show similar and different use of lexical and zero anaphors?
3. What factors may contribute to the different anaphoric use between the two groups?

To achieve the purpose of this study, two discourse contexts were distinguished. One was a high topic continuity (HC) context, which was supposed to induce wide use of zero anaphor; the other was a low topic continuity (LC) context, which was expected to elicit extensive use of lexical anaphor. Based on the URM rule and the results of previous studies (Chen 1984, Clancy 1980, Givón 1983, Li & Thompson 1979, Pu 1997), the following hypotheses were formed:

1. Chinese and English speakers will show different use of lexical and zero anaphors in the HC context and in the LC context;
2. Both Chinese and English speakers will prefer using zero anaphors in the HC context;
3. Both Chinese and English speakers will prefer using lexical anaphors in the LC context.

## 1. METHOD.

1.1. PARTICIPANTS. The participants in this study were 19 native Chinese speakers and 11 native English speakers, aged between 20 and 40. Eighty percent of the participants were from a science background and had limited linguistic knowledge. At the time of the experiment, the participants were either working or studying in Alberta, Canada.

1.2. TASK. A controlled story-writing task was employed in this study. By controlled we mean both subject groups were presented with experimental materials that had similar vocabulary and anaphors occurring in the same discourse, semantic, and syntactic contexts. There were two reasons for using such a task. First, a controlled task could guarantee the occurrence of a large number of zero and lexical anaphors; second, we believed that the results of a controlled task could allow us to make better comparisons between the two language groups.

1.3. MATERIALS. The experimental materials were six short scenarios written by the researcher (first author), each consisting of both HC and LC contexts. In designing the HC context, we first made sure that the included events occurred continuously with no disruption. Second, because different modes of presentation such as description of mental state vs. outward appearance can lead to the use of different referential devices (Chu 1998), great efforts were taken to ensure that the HC context was based on a similar mode of presentation. Thus, the HC context in this study was characterized by a series of events happening without interruption to one referent. These events were coded by semantically linked action verbs, reflecting a single mode of presentation, i.e. narration of events. There were ten such contexts distributed unevenly across the six scenarios. Each context was preceded by an introductory clause providing background information. The number of events in the contexts varied both within and across some of the six scenarios. As a result, the total number of events was not the same in all of the scenarios.

Following each HC context was a less continuous event signaling the breakdown of high topic continuity, the result of which was a LC context. Five commonly acknowledged factors that can cause such a breakdown were adopted in this study. They are:

- a. change of modes of presentation, such as from a description of actions to that of a state of mind,
- b. change of time,
- c. change of place,

| Scenario | Number of HC contexts | Number of events in each HC context | Total number of events in the HC context | Number of LC contexts |
|----------|-----------------------|-------------------------------------|------------------------------------------|-----------------------|
| 1        | 1                     | 5                                   | 5                                        | 1                     |
| 2        | 1                     | 5                                   | 5                                        | 1                     |
| 3        | 2                     | 1 & 2                               | 3                                        | 2                     |
| 4        | 2                     | 1 & 2                               | 3                                        | 2                     |
| 5        | 3                     | 2, 2, & 3                           | 7                                        | 3                     |
| 6        | 1                     | 5                                   | 5                                        | 1                     |

**Table 1.** Detailed distributive information in the six scenarios.

- d. change of referent,
- e. change of descriptive mood, such as from story to narrator's comment.  
(Chen 1984, Chu 1998, Li & Thompson 1979, Pu 1991, 1997)

Each of these five factors was tested twice across the six scenarios, yielding ten less continuous events, thus ten LC contexts. The ten contexts were also unequally distributed across the six scenarios.

The investigation of anaphor use in this experiment was limited to anaphor contexts in the syntactic subject position, since referents occurring in other positions are syntactically constrained in English and have to be coded by lexical anaphors. See **Table 1** for the detailed distributive information for each scenario.

1.4. PROCEDURE. In order to present the story in a form that was as neutral as possible with respect to anaphor use, the following steps were taken: (1) small pictures instead of lexical or zero anaphor were used to represent the main referent, as several pilot studies have shown that the use of either lexical or zero anaphors was likely to induce biased results, (2) no punctuation marks were shown except in the last sentence, (3) the story events were presented line by line instead of in running paragraphs. These presentation principles are demonstrated in example (1).

- (1) *Li Ming zhongyu dao jia le*  
'Li Ming finally arrive home ASP'  
☺ *tui kai men*  
'push open door'  
☺ *da kai deng*  
'turn open light'  
☺ *zou jin ziji de fangjian*  
'walk into self's room'  
☺ *tuo xia dayi*  
'take off coat'  
☺ *tang zai chuang shang*  
'lie in bed'

| Type of anaphor  | Chinese | English |
|------------------|---------|---------|
| Zero anaphor     | 77      | 47      |
| Lexical anaphor  | 17      | 47      |
| Full noun phrase | 6       | 6       |

**Table 2.** *Percentage of anaphor types in the HC context.*

- (1)      zhe shihou, ☺    juede zhenshi shufu ji le.  
         ‘right then,      feel really wonderful’

In this scenario, there was one context each of HC and LC. The HC context was formed by the first five events (excluding the introductory clause) that were considered to be fairly continuous. In this context, zero anaphors were predicted to predominate. The LC appears in the last clause. In this clause, the adverbial phrase ‘right then’ indicates a change of local topic (i.e. from action to state of mind). Thus, lexical anaphors were expected to be highly favored here.

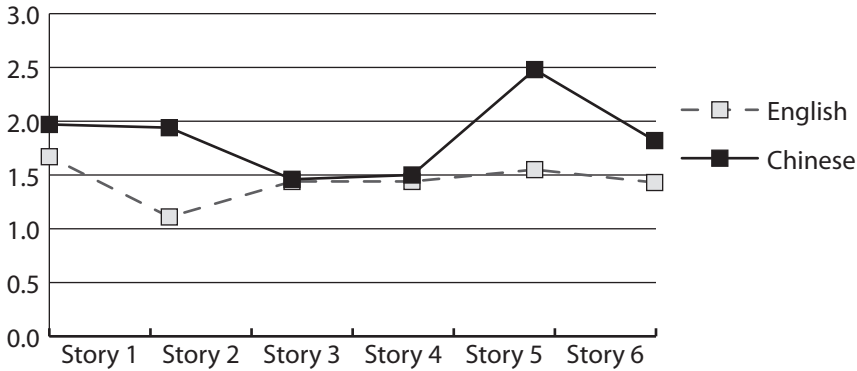
To complete the task, all the participants were instructed to write six coherent and connected short stories based on the six scenarios provided. In their writing, they were allowed to add words if necessary but were not allowed to change, delete or add content. They were encouraged to go back to read the stories in order to see whether they were truly coherent and connected. All stimulus materials were presented to the participants in their native language.

2. RESULTS.

2.1. RESULTS IN THE HC CONTEXT. **Table 2** presents an overview of the percentage of anaphor types used by the Chinese and English groups.

As **Table 2** reveals, the Chinese group adopted considerably more zeros than lexical anaphors in their production while the English group used an equal amount of these two forms. Compared to the English participants, the Chinese participants used many more zeros but fewer lexical anaphors. In addition to these results, both groups were also found to employ a small number of full NPs. A close look at the participants’ samples showed that the Chinese speakers mostly adopted lexical anaphors in the first continuous event following the introductory clause. The English speakers, however, employed this form in other events as well. The use of lexical anaphor in the first event might be attributed to the different modes of presentation between this event and its preceding clause. Possible reasons for the different group behaviors are discussed in section 3.

The results in **Table 2**, however, do not indicate whether the difference between the two groups is significant. They also do not show whether there was any stimulus effect on the observed anaphoric patterns. Therefore, two-way ANOVA tests were carried out to see (a) whether this difference was statistically significant, (b) whether there was any story effect on the anaphor selection in the two groups, and (c) whether there was any interaction effect between the two main factors: group and story. Data transformation (square root) was conducted before the ANOVA tests were performed.



**Figure 1.** Means of group and story interaction for zero anaphor.

**2.1.1. ZERO ANAPHORS.** The results of the two-way ANOVA tests revealed a main effect for group [ $F(1, 168) = 153.8, p < .0001$ ], suggesting that the number of zero anaphors produced by the Chinese speakers was significantly higher than that by the English speakers. The results also showed a significant main effect for story [ $F(5, 168) = 28.8, p < .0001$ ], indicating a strong stimulus effect. The interaction effect between group and story was found to be significant as well [ $F(5, 168) = 21.56, p < .0001$ ]. This interaction effect is plotted in **Figure 1**.

As **Figure 1** shows, the Chinese group used zero anaphors the most in story 5 followed by stories 1, 2, and 6, and the fewest in stories 3 and 4. This result was proportional to the total number of events in each story. In other words, the higher the total number of events a story had, the more zero anaphors it induced. For example, story 5 had the highest number (7) and it yielded the largest number of zeros; stories 3 and 4 had the lowest number (3) and they generated the smallest number of zeros. **Figure 1** also shows that the Chinese participants were inclined to behave similarly in stories with the same number of continuous events. Accordingly, their anaphoric patterns were similar in stories 3 and 4 and in stories 1, 2, and 6, respectively.

As for the English group, **Figure 1** reveals a quite homogeneous result across the stories except for story 2. This homogeneous result shows that the number of zero anaphors produced did not positively correlate to the total number of events in a story. Story 5, for instance, had the highest total number of events, but it ended up with almost the same number of zeros as did stories 3, 4, 6, and 1. Furthermore, unlike their Chinese counterparts, the English participants did not tend to exhibit similar behaviour in stories with the same number of events.

Comparing the Chinese and English groups, we can see that they behaved almost identically in stories 3 and 4, but differently in other stories. A possible reason for this is the unequal number of events included in the HC context(s) in the stories. The number in stories 3 and 4 ranged from one to two, but the number in stories 1, 2, and 6 was five. The smaller number in the first two stories could be the cause for the rather

similar use of zero anaphor in the two groups while the larger number in the latter three could have presented opportunities for differences.

The number of events, however, cannot provide a reasonable account for the largest group difference observed in story 5, since this story also had smaller numbers (two and three). A close look at the stimulus materials shows that story 5 had something that was lacking in others, i.e. one of its HC contexts involved three temporal connectives to show order of events. This HC context is illustrated in example (2).

- (2) In the school, ☺ was very busy  
 ☺ first had his English class  
 ☺ then went to see his chemistry professor  
 ☺ later on went to his computer class

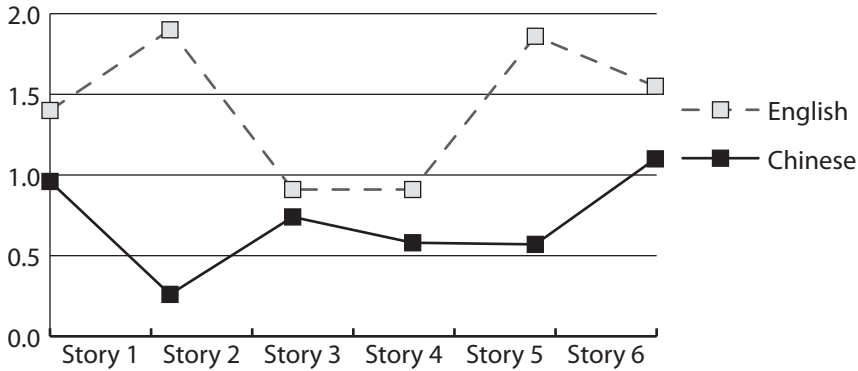
The participants' writings also showed that this site produced the greatest disparity between the two speaker groups. At this site, zeros were the dominant form for the Chinese group whereas lexical anaphors were dominant for the English group. A possible explanation for this contrastive anaphoric behavior is that in a high topic continuity context, temporal connectives are not likely to pose any syntactic constraint on anaphor selection in Chinese; however, they may pose some constraints in English. Syntactic constraints here refer to an obligatory use of lexical anaphor in the subject position of clauses. This explanation seems to suggest that topic continuity may be the primary factor determining the distribution of zero anaphor in Chinese, but it is not in English, as syntactic requirements in English have to be fulfilled first.

The crucial importance of syntactic factors in English could also be another cause for the second largest group difference, noted in story 2. Besides having the highest number of continuous events, story 2 also consisted of three events coded by passive constructions. This construction was found to have elicited more lexical anaphors in the English data than in the Chinese data.

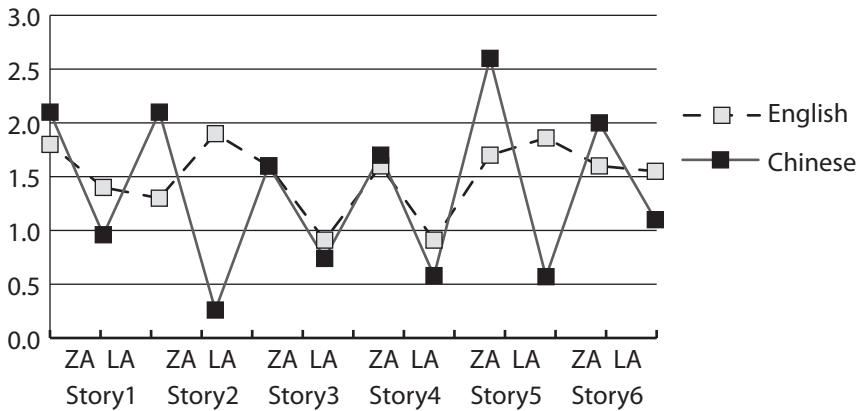
**2.1.2. LEXICAL ANAPHORS.** The two-way ANOVA test yielded a significant effect of group [ $F(1, 168) = 116.9, p < .0001$ ], suggesting that the English group used significantly more lexical anaphors than the Chinese group. The test also showed a significant main effect for story [ $F(5, 168) = 8, p < .0001$ ], and a significant interaction effect [ $F(5, 168) = 12.9, p < .0001$ ] as well. The interaction effect is represented graphically in **Figure 2**.

Overall, although **Figure 2** displays a rather different result from that in **Figure 1**, it also shows a similar trend to **Figure 1**. That is, more similarities were observed in stories 3 and 4 than in other stories, and greater discrepancies were found in stories 2 and 5. However, **Figure 2** reveals that instead of story 5, story 2 created the largest group difference. This difference, as the figure shows, came from the Chinese speakers' rather low production of lexical anaphors in story 2, which could be due to the influence of semantic constraints on Chinese anaphor selection. Unlike the referents in other stories, the referent in story 2 was inanimate. In Chinese, using lexical ana-





**Figure 2.** Means of group and story interaction for lexical anaphor.



**Figure 3.** Means of group and story interaction for zero and lexical anaphors in the HC context.

phor to represent an inanimate referent can make a sentence sound awkward in most situations. The Chinese participants' writings also revealed that this story induced the highest number of full NPs.

**2.1.3. SUMMARY OF THE HC CONTEXT RESULTS.** To better look at the anaphoric pattern exhibited by the two groups, I have combined the results of zero and lexical anaphors, and this is shown in **Figure 3**.

As can be seen in **Figure 3**, the Chinese group produced a quite uniform result, showing a high preference for zero anaphor in all stories. However, a rather mixed result was observed in the English group, who exhibited high preference, low preference, and non-preference for zeros across the six stories. These varied group results only partly supported our hypothesis that in the high topic continuity context, both Chinese and English participants will prefer zero anaphor to lexical anaphor.

| Type of anaphor  | Chinese | English |
|------------------|---------|---------|
| Zero anaphor     | 7       | 5       |
| Lexical anaphor  | 59      | 72      |
| Full noun phrase | 34      | 23      |

**Table 3.** *Percentage of anaphor types in the LC context.*

Comparing the two groups, we can see that they exhibited an almost identical anaphoric pattern in stories 3 and 4, choosing zeros as their dominant form. A similar tendency was also noted in story 1, but to a much less degree. In this story, although both groups showed a preference for zero anaphor, the Chinese group indicated a much higher degree of preference than their English counterpart. In other stories, the two groups even formed a different preference pattern, i.e. zero for the Chinese but lexical for the English.

2.2. RESULTS IN THE LC CONTEXT. The LC context was characterized by a less continuous event, which disrupts the high topic continuity established in previous clauses. Unlike the varied results in the HC context, the anaphoric pattern in this context was quite consistent across all participants.

As shown in **Table 3**, a vast majority of the anaphors used were either lexical anaphors or full NPs. This finding provided full support for our hypothesis that when topic continuity decreases, both Chinese and English speakers will choose lexical anaphors over zero anaphors.

**Table 3** also shows another interesting result; that is, more lexical anaphors were observed in the English group, but more full NPs were found in the Chinese group. This difference, as discussed in 2.1.2, was attributed to the greater effect of semantic constraints on Chinese participants' anaphor choice in story 2.

3. CONCLUSION. In this study, we examine the use of lexical and zero anaphors in Chinese and English discourse. Our results have shown that the Chinese and English participants were both sensitive to changes in discourse contexts. They employed considerably more zero anaphors in the HC context than in the LC context, but many more lexical anaphors in the LC context than in the HC context. Specifically, both subject groups showed a dominant preference for lexical anaphor in the LC context and zero anaphor in the HC context which involved one or two continuous event(s). These results agree with the prediction that Chinese and English speakers would distinguish their anaphor use in different discourse contexts. These results seemed to suggest that these two groups followed the universal referential management rule in a similar way; i.e. using zero anaphor to maintain the highest continuous topic, and lexical anaphor to keep track of a less continuous one.

However, our results have also indicated that these two groups did not follow the URM rule in exactly the same way. This was rather evident in the HC context that required syntactic concerns and that included a relatively larger number of continuous events. In these two situations, the Chinese participants were quite consistent

in their anaphoric behavior and always showed a high preference for zero anaphor; however, no such consistency was found in the English group, where even lexical anaphors were their first choice in some stories.

What might have caused such divergent behaviors in the discourse context that consisted of highly connected events? We suggest that these different anaphoric behaviors might be typologically determined. According to Li and Thompson (1976), Chinese is a topic prominent language and English a subject prominent language (see Li and Thompson 1976 for extensive coverage on the nature of subject and topic). In a topic-prominent language, the notion of topic, which is discourse-dependent, plays an essential role. The crucial importance of topic makes a discourse constraint the essential factor. Topic continuity is one such constraint. Thus, in Chinese discourse, a minimal coding, zero anaphor, is greatly preferred when a topic is highly continuous, while a heavier coding, lexical anaphor, is predominantly employed when a clear disruption of high topic continuity occurs.

On the other hand, in a subject-prominent language, the notion of subject, which is sentence-dependent, is crucial. In English, the central role of the grammatical subject is reflected in the existence of dummy subjects, e.g. *it* in the sentence *It is raining*. As far as anaphor selection is concerned, this strong emphasis on subject has the following two effects. Firstly, it makes a syntactic constraint the decisive factor; thus, the choice between lexical and zero anaphors in English must first meet its syntactic requirements, and then discourse rules. This explains the English participants' prevalent use of lexical anaphor in stories 5 and 2, where syntactic constraints were involved. Secondly, it leads to a low tolerance level of zero anaphor, especially in a longer stretch of discourse. This lower tolerance level may in turn account for the English participants' wide use of lexical anaphors in the HC context which involved a higher number of events with no syntactic concerns.

Finally, our results show that Chinese and English speakers used lexical and zero anaphors similarly in contexts with clear indications of low and high topic continuity. The clear indication of high topic continuity was characterized by one to two continuous events in this study. However, for typological reasons, the anaphor use of these two speaker groups not only differed in the upper limit on the number of events conjoined but also in the effect of syntactic constraints. These results seem to suggest that the higher the number of events is included in a HC context, the less Chinese and English share their use of lexical and zero anaphors. Furthermore, the more syntactic constraints are involved, the less Chinese and English share their use of these two anaphoric forms.

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## LANGUAGE INDEX

This index contains references to languages, language groupings (families, subfamilies, etc.) and scripts (writing systems) or other methods of language representation as they are analyzed or otherwise mentioned in the text. Due the prevalence of English, all references or use of English for purposes not related to the analysis of English as a language, such as glosses or concept labels, are excluded. Language names are in **bold face**, language families and groupings are in **BOLD SMALL CAPS**, and names of scripts or other language representation systems are in *bold-italic*.

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